# Public Private Partnerships in infrastructure procurement: A Generic Multi-Attribute Hierarchical Model for minimising pre-contract time and cost overruns (GmAHM)


**By**

**Marcus K Ahadzi**


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**School of the Built Environment**
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# Abstract


**Public Private Partnerships in infrastructure procurement:
A Generic Multi-Attribute Hierarchical Model for minimising pre-contract time and cost overruns (GmAHM)**

The pre-contract phase of the Public Private Partnerships (PPP) procurement process in the UK has suffered the problem of bidding cost and time overruns since its introduction in the early 1990s. The main contribution of this piece of research is a greater understanding of the competency gaps within the public and private sector organisations that contribute to these procurement problems.

A Generic Multi-Attribute Hierarchical Model is developed that identifies those characteristic attributes of the project environment that significantly influence the ability to negotiate PPP contracts in a timely and cost effective manner. The differences in perception between public and private sector parties on the relative importance of the attributes that contribute to successful negotiation are investigated.

The study adopted the quantitative research methodology, using descriptive statistics to investigate the extent of bidding time and cost overruns. Inferential statistics are used to develop, test and validate the generic model and investigate the perceptual differences between the public and private sectors on the respective negotiation success attributes. The sample was drawn from the health, schools and civil engineering sectors within the UK.

The research yielded three important outcomes. Firstly, the pre-contract time and bidding cost are generally high for PPP projects with the health and education sector projects experiencing exceptionally high overruns. Secondly, the study identified the public sector client's organisational and technical attributes as the most significant ones that influence the efficiency of the pre-contract procurement process, followed by those of the Consortium, the Project, and the External Environment. Thirdly, though there is general agreement within the public and private sectors on the hierarchical order of significance of the main attributes, differences in opinion occurred on such sub-attributes as the public sector client sensitizing public opinion on projects, the consortium's openness during negotiations and their early involvement of the stakeholders, including their readiness to accept risks.

# DEDICATION

To

**SARAH**
My ever-supportive and all-encouraging wife,

Our pleasant and loving children

***Dzifa,*** ***Delali,*** and ***Selassi***

and

To the memory of my senior brother

**Emmanuel**

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# Glossary of Terms and Abbreviations

| | |
|---|---|
| BAFO | Best And Final Offer |
| DBFO | Design, Build, Finance and Operate. A contract let under the principles of public private partnerships/private finance initiative whereby a private sector company (or a consortium of companies) undertakes the design and construction of the facility and thereafter maintains it for a considerable length of time, often 25-30 years. |
| Due Diligence | A process of enquiries carried out by the financiers to ensure that the proposed contract they would be financing complies with their laid down criteria and regulations, especially the risks they are exposing themselves to are within acceptable limits. |
| Financial Close | The date at which the lenders and equity investors begin to advance the necessary funds and other steps necessary to conclude the contract. |
| OJEC | Official Journal of the European Commission. |
| ONS | Office of National Statistics |
| PFI | Private Finance Initiative |
| PPP | Public Private Partnerships |
| Preferred Bidder | A bidder selected for final negotiations prior to the letting of the contract |
| Project Company/Special Purpose Vehicle | A company set up by private sector consortium to sign a PPP/PFI contract often with its responsibility under that contract being its only activity. |
| Public Sector Comparator | A benchmark based upon the estimated cost of a publicly funded project against which the value for money and risk transfer of a public private partnership/private finance initiative project can be assessed. |
| Reserve Bidder | A bidder (normally that placed second after final bids) invited to keep their bid open for acceptance so that competitive pressure is maintained during the negotiations with the first-placed bidder until the contract is signed. |
| Shadow Toll/Tariff | An amount paid by the client (not directly by the users) to the private sector operator or provider of the facility and/or services |

# Chapter 1 Introduction

# Chapter 1 Introduction

## 1.1 Rationale and Need for the Research

The ever increasing demand on public infrastructure, the lack of requisite public funds to invest due in some instances to the apparent resolve of the electorate not to vote for governments that are explicit on introducing higher taxation, and the recognition that the private sector has the financial, managerial and technical potentials, coupled with the realisation that the state still needs to retain some substantial role in the provision of these services, set the stage for a new strategic rethink in public procurement - ***the Public-Private Partnerships (PPP).***

The basic principle behind this strategic rethink is that state departments are to be transformed from being owners and operators of state assets into the purchasers of services from the private sector. The private sector becomes long-term providers of services which they deliver by taking the responsibility for the design, construction, financing and the operation of the assets. The Public Private Partnerships (PPP) have therefore become a rapidly growing means of procuring infrastructure assets and their associated services, signalling a fundamental shift in the relationships between the state and industry. The UK for instance established its version of this strategic rethink through the launching of the Private Finance in 1992.

Despites the global appeal of the PPP strategy and the other variants such as the Build Operate and Transfer (BOT), delays and spiralling bidding costs during the pre-contract stages with some advisory cost overruns of up to 600% have frequently been cited as major impediments in the implementation of this philosophy. This has resulted in the expression of dissatisfaction by the private sector participants in particular and in some cases the general public (The Herald, 2002; Ward, 2002; NAO, 1999; Owen and Merna, 1999). Akintoye *et al*, (2003), during their groundbreaking research into the management of risks within privately financed projects in the UK, indicated that the rather long and lingering negotiation periods was frequently cited by industry practitioners as one of the main impediments to the early and efficient realisation of projects and therefore a major contributor to the rather high cost of the PPP bidding process.

In spite of the enormous amount of debate within the media and in other forums about the rather expensive and time consuming nature of the PPP/PFI procurement process towards reaching agreement, there has not been an all-embracing research encompassing the entire spectrum of attributes that impact on the successful implementation of the process during the pre-contract stages. A fair amount of research has however been carried out on other areas of the PPP procurement. Akintoye *et al.*, (2001), and Bing Li *et al.*, (2002) for example examined risk assessment and management within projects procured through the strategy; the Construction Industry Council (2000), also commissioned research into the role of cost saving and innovation in projects procured through the strategy; and Pollock *et al.*, (2002), reviewed the value for money issues in PFI/PPP projects within the health sector.

The introduction of this new and innovative way of procuring infrastructure services means a change in the way the industry's services are rendered and/or purchased by the respective stakeholders. This requires either partial, and in some circumstances, the complete restructuring of the relationships between the stakeholders. Change introduces risk and uncertainties. It is therefore not surprising that delays, frustrations and the pre-contract cost overruns have been reported in the implementation of the PPP strategy (Tam, 1999). Mott Macdonald (2002) in their document – *Review of Large Public Procurement in the UK* - came up with the finding that due to the rather prolonged nature of the pre-contract stages of the PPP/PFI procurement process, overall project completion times are longer when compared to other modes of procurement strategies such as the traditional form. This, however, should not remain an endemic feature of the system. Hence the main objective of this study is investigate and develop a model that clearly identifies the key attributes that make the pre-contract processes work more efficiently and effectively.

Over the past three decades, infrastructure procurement has primarily been based on the traditional form of procurement where the client clearly defines what is to be executed by the contractor. The result of this prescriptive mode of procurement is that bidders are literally bidding from a common platform and so the successful bidder is chosen principally on the basis of the lowest priced bid as pre-qualification would have determined the technical capabilities of the contractors in advance. This

traditional form of procuring the services of contractors could be likened to what is referred to in the marketing literature as *routinized-exhange* where the terms are established by administered programmes of pricing and distribution (Kotler, 1997). Hence it would be fair to conclude that the relevant skills for pre-contract negotiations have for some decades now been lacking both within the private sector and public sector.

The concept of the PPP procurement strategy has of necessity introduced the element of negotiation as bidders are being called upon to submit innovative design proposals that meet the output specifications of the clients. Ahadzi and Bowles (2001a) identified the contract negotiation as the critical stage during which delays are most prominent during the procurement of PPP projects. There is therefore an urgent need to educate and inform practitioners and the public sector alike on those salient factors and/or attributes that make for the effective negotiation of the complex contracts envisaged under the PPP delivery mode.

Contract negotiations become necessary when many factors bear not only on price, but also on quality and service. Additionally, when business risks cannot be predetermined accurately, and where a long period of time is required to produce the item or service, including production being interrupted frequently because of frequent change orders, negotiations become a necessity Kotler (1997). The aforementioned elements feature very prominently in any PPP project procurement due to the fact that the projects are generally not only complex in nature but can sometimes spread over different locations, particularly school projects.

The current research therefore aims at developing a Generic Multi-Attribute Hierarchical Model, the essence of which is to add to the understanding of the importance of proactively managing the PPP contracts negotiation process in a more efficient manner in order to minimize and if possible eliminate the undue delays and the huge bidding cost overruns during the pre-contract stages. It should also help others in the business of contract negotiations to recognize the need for a broader perspective in their approach to the negotiation process so as to eliminate the reported 80% of negotiating time being spent on arguing (Kennedy *et al*, 1987 pg 51).

The study is based on the UK, a country in the forefront of not only adopting the strategy but also vigorously refining and promoting it internationally (D&P Report, 2001; Stone, 2001). The focus of this research is on the risks of pre-contract time and bidding cost overruns due mainly to the protracted negotiations. With the initial outlay in both human and capital investment during the bidding period already generally high for both the private sector consortium and the public sector client, any delays in the process will not only exacerbate the situation but will mean missing opportunities for the needed investment in the development and renewal of public infrastructure, and economic and social advancement.

Time plays a crucial role in any contract negotiations; i.e. time as a function of economic consequence in terms of cost. Time is therefore a critical function of the bargaining process itself. The weighting to be given to time factor relative to the achievement of the outcome of a negotiation will reflect not only the cost involved and the discounting loss but also the need to secure the business quickly in relation to forward orders and work in hand in the case of the contractor. In respect of the client organisation this may represent the benefits lost as a result of the delays in bringing the project forward for the services to be delivered. These costs for the public sector client would not only represent an embarrassment but also a strain on existing facilities for example school projects.

## 1.2 The Research Objectives and Propositions

The research therefore has three objectives.

i) To investigate the extent of pre-contract cost and time overruns when using the PPP philosophy in procuring infrastructure projects. Delays and spiralling bidding costs during the pre- contract stages have frequently been cited as a problem in the implementation of this philosophy, resulting in particular, the expression of dissatisfaction by the private sector participants. The pre-contract process in this context can be defined as the period between pre-qualification and placing of the contract with the successful bidder.

ii) To identify those characteristic attributes of the Private Sector Consortia, Public Sector Client Organisations, the Project, and the External Environment, that significantly contribute to the successful negotiation of PPP/PFI contracts in a timely and cost effective manner; and then develop a Generic Multi-Attribute Hierarchical Model capturing these respective

attributes, the main components of which are illustrated in Figure 1.2 below.

iii) To explore the differences in perception between public and private sectors on the relative importance of the attributes in contributing to the negotiation success. Highlighting such perceptual differences will lead to a greater understanding of the importance that each party places on various elements of the negotiation. This should them to identify and work on potentially tricky and contentious areas from the outset and to better understand each others concerns and values.

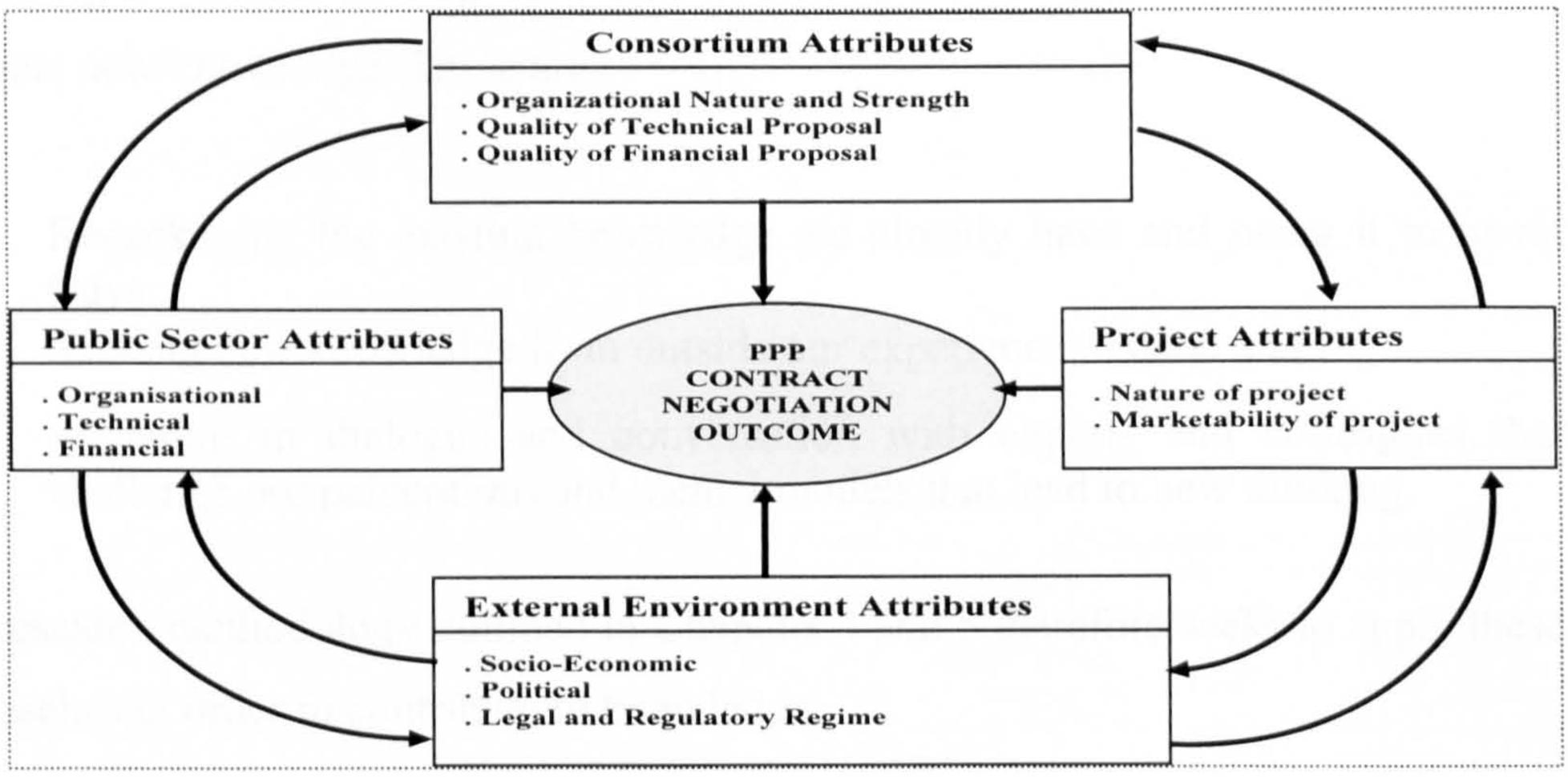



**Figure 1.1 PPP & Contract Negotiations: Outline of the Generic Model**

*Negotiation outcome* in this research refers to time and cost efficiency during the pre-contract stages of the PPP procurement, where efficiency relates to the ability of the parties to minimise and/or eliminate unnecessary time and cost overruns and yet strive to conclude the deals in a satisfactory manner in terms of obtaining value for money.

The propositions for this study are therefore:

1) The twin problems of pre-contract time and cost overruns are real in the PPP infrastructure procurement and therefore remain a serious issue to be addressed if the philosophy is to gain general acceptance among all stakeholders.

2) A generic model can be developed to capture in a hierarchical order of significance the key attributes that positively influence the efficient and effective implementation of the negotiations phase of the PPP procurement process in terms of minimising times and cost overruns to the parties.

3) Though there is a broad agreement between the key stakeholders (the public and private sectors), on the relative significance of the main attributes of the Consortium, the Public Sector Client, the Project, and the External Environment on the outcome of the PPP contract negotiations, differences do exist amongst these key stakeholders on the underlying dimensions to these main influence centres as to their effect on the outcome of the PPP contract negotiations.

## 1.3 Contribution to Knowledge

According to Thurbin (1998), there are three sources that can be tapped into in order to create new knowledge. These are:

- Repackaging the existing knowledge we already have and using it in novel ways;
- Seeking new knowledge from outside our experience to date; and
- Engaging in dialogue and conversation with experts and colleagues that challenge our perceptions and mental models that lead to new thinking.

The research methodology outlined in Chapters 4 and 5 therefore seeks to apply these approaches in order to contribute to knowledge.

The contribution to knowledge through this piece of research is therefore expected to be seen as:

- Highlighting the extent to which the twin problems of pre-contact time and cost overruns are real in the PPP/PFI procurement.

- Raising awareness among all the stakeholders within the PPP/PFI industry, of the importance of proactively identifying and managing the key attributes which impact on the PPP negotiation process as a means of achieving sound project outcomes.

- Contributing to conceptual thinking in the area of contract negotiations relevant to pre-contract stages of the PPP/PFI procurement process.

## 1.4 Motivation for the Research

The motivation for this research arose out of:

- The ever increasing concern about the unduly long time to progress PPP/PFI projects through the signing of the contract and the resultant costs to the parties;

- The growing interest being shown in adopting the PPP approach to infrastructure procurement and the need to develop models that can be effectively be used to manage the process smoothly;

- Reported cases of failures and difficulties encountered in a number of developing countries in their attempt to procure infrastructure projects through the PPP procurement route. It is hoped that the knowledge generated from the UK experience could conveniently form the basis for other nations to frog leap their process rather than attempting to re-invent the wheels and end up making same initial mistakes.

## 1.5 The Research Approach

Figure 1.2 provides an outline of the methodology adopted for this research.

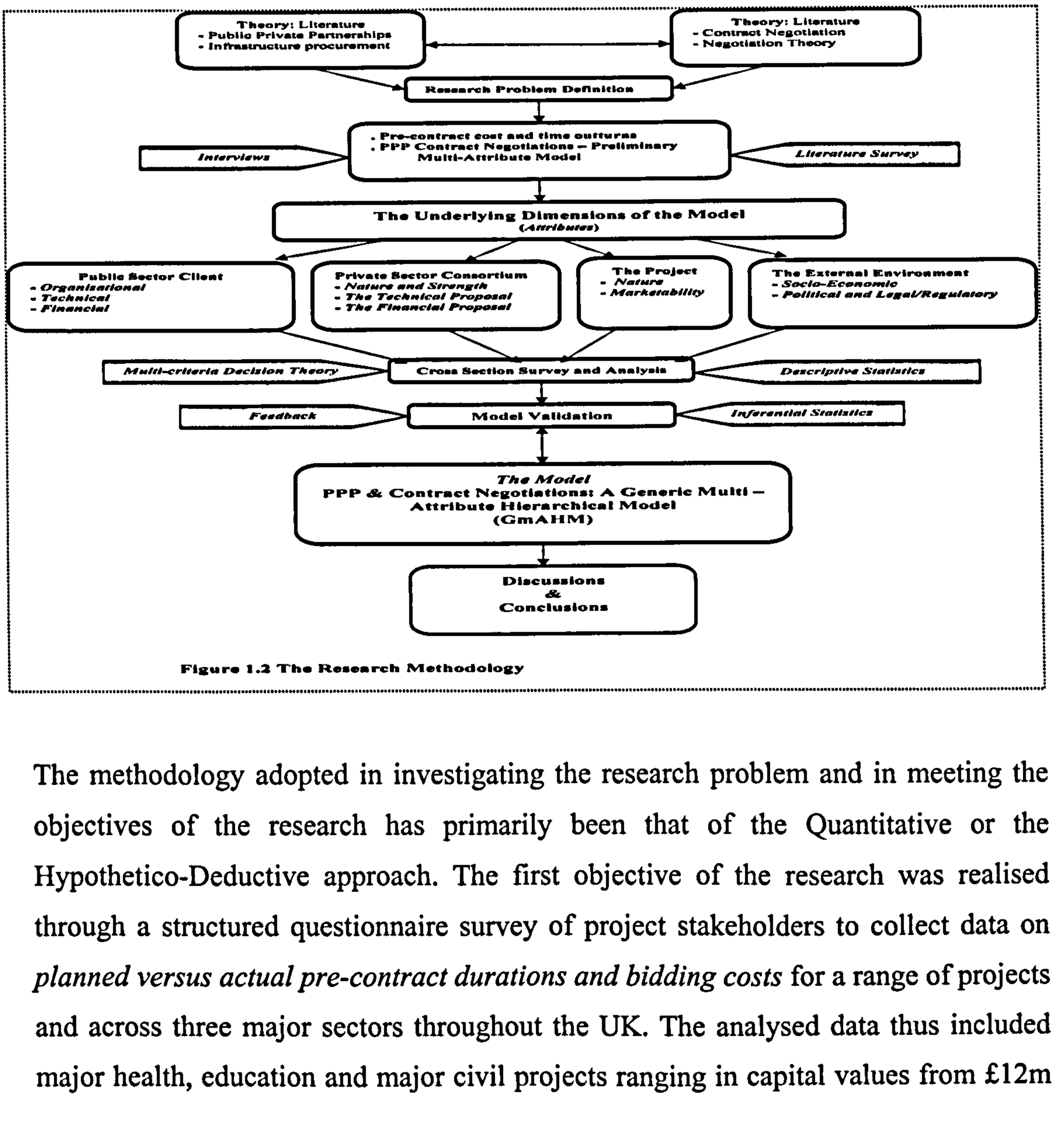



**Figure 1.2 The Research Methodology**

The methodology adopted in investigating the research problem and in meeting the objectives of the research has primarily been that of the Quantitative or the Hypothetico-Deductive approach. The first objective of the research was realised through a structured questionnaire survey of project stakeholders to collect data on *planned versus actual pre-contract durations and bidding costs* for a range of projects and across three major sectors throughout the UK. The analysed data thus included major health, education and major civil projects ranging in capital values from £12m

to £1300m. The UK is currently in the forefront of not only embracing the strategy but also vigorously refining and promoting it internationally since it first launched the concept through the Private Finance Initiative (PFI) in 1992 (D&P Report, 2001; Stone, 2001). The analysis of the data for this objective was done using descriptive statistics.

The other two objectives were realised through the extensive review of literature relating to negotiation and bargaining theory to identify the influencing factors on successful contract negotiations, supplemented with preliminary interviews and information obtained during workshops and public forums on a major PPP/PFI schools project in the UK, and during a major international conference on the PPP/PFI as an emerging global procurement strategy held in London in June 2001. Multi-criteria analysis was used to evaluate the results of the structured questionnaire survey data and to develop the model for a range of attributes relating to the Consortium, the Public Sector Client, the Project, and the External Environment that significantly influence the success of the negotiation process.

Multi-Criteria Decision Theory is based on the principle that among all achievable scores for any *i*th attribute, there is at least one extreme or ideal value that is preferred to all others. This, according to Zeleny (1982 pp 153-198), may be called the 'anchor value' and denoted as $x^*i$. There is thus the axiom that: *Alternatives that are closer to the ideal are preferred to those that are further away. To be as close as possible to the perceived ideal is the rational to human choice.* The approach is to have the decision maker range the attributes in order of their significance e.g. low significance =1, average significance =2, etc. This methodology has been used extensively in project management and construction related research (Mangitung and Emsley, 2002; Cheung *et al.*, 2000; Wong *et al.*, (2002); Kumaraswamy and Dissanayaka 1998; Okpala and Aniekwu, 1988).

The theoretical framework for the research has thus been drawn primarily from the existing knowledge in negotiation theory and the evolving contributions to the literature on contract procurement. The model was tested and validated using Spearman's Rank Correlation Coefficient and Kendall's Coefficient of Concordance.

Feedback obtained from the respondents on the model through postal validation and e-mails also added strength to its validity.

The list of respondents for the questionnaire survey was drawn from a database compiled by Centaur (publishers of the PFI Report) in collaboration with HM Treasury (Centaur, 2002). This database contains a comprehensive listing of the names of top ranking construction and consultancy firms, financial institutions, public sector clients and individuals involved in project procurement using the PPP/Private Finance strategy including the list of PPP/PFI projects they were involved in. In all 300 questionnaires were sent out to individuals selected primarily on the basis of their having been involved in concluded deals either as project managers, legal, technical or financial advisers, out of which 62 were returned representing a response rate of 21%. Out of the 62 returned responses, 49 were found adequately completed for the analyses. As a check for non-response bias, the response rate for this study was compared with the level of responses obtained for other UK wide research in the area of the PPP/PFI. Bing Li *et al.*, (2002) reported 12% rate (61 out of 500) for their research on Risk Management in PPP and 9.9% (68 of 700) for the Institute for Public Policy Research's (IPPR) call of evidence for consultations on the PPP. Again because the questionnaire was designed to collect project specific data, further comparison was made with signed PPP/PFI projects nationwide. The representation was found to be 20% of the signed projects.

## 1.6 Definition of Terms

The following briefly describe the key terms that relate to the concepts covered under this study.

### 1.6.1 Public – Private Partnerships

Although the term Public Private Partnership may be interpreted in different contexts from country to country, it is essentially a form of collaboration between the public and private sectors. A classical definition is therefore provided by the Canadian Council for Public-Private Partnerships as: " *A cooperative venture between the public and private sectors, built on the expertise of each partner, that best meets clearly defined public needs through the appropriate allocation of resources, risks and*

*rewards"* (CCPP, 2001 pp v). The basic principle is that state departments are transformed from being owners and operators of assets into the purchasers of services from the private sector, with private sector becoming long-term providers of services which they deliver by taking the responsibility for the design, construction, financing and the operation of the assets.

### 1.6.2 Stages of the PPP project procurement

The entire PPP procurement process may be broken into four main stages; i.e. the Planning and Feasibility phase, the Bidding and Negotiation phase, the Construction phase, the Operation phase and possibly the Transfer and/or Renegotiation phase. For convenience of contract administration, the UK Treasury Taskforce on the PFI redefined the stages in three broad categories (TTF, 1997):

i) The ***procurement*** stage, during which the public sector client organisation established its contract management ground rule for the life of the contract. This covers all activities up to the award of the contract.

ii) The ***development*** stage, which covers the period from award of contract to the start of payments on commencement of the delivery of the services required by the output specifications.

iii) The ***delivery*** stage covering the provision and use of the contracted services during the remaining life of the concession contract.

### 1.6.3 Contract Negotiations

Walton and McKersie (1965) in their research on labour negotiations defined negotiation as a dynamic interaction of, and an awareness of inherent conflict of interest in a decision-making situation out of which the parties must wish to solve common problems or wish to integrate their interests in other ways. McCall and Warrinton (1989) also defined it as follows:

*Negotiation is any sequence of written and/or verbal communication process whereby parties to both common and conflicting commercial interests and of differing cultural backgrounds consider the form of any joint action they might take in pursuit of their individual objectives which will define or redefine the terms of their interdependence.*

The most prevalent concern in bargaining research has therefore centred around how to best identify the factors that determine the outcome of the negotiation in terms of (a) whether an agreement will be reached, (b) the amount of time required to reach an

agreement, (c) the nature of the agreement, and (d) the degree of satisfaction with the agreement and the commitment to carry it out.

## 1.7 Summary of the Research Outcome

The findings of the research are briefly outlined as follows:

### 1.7.1 Pre-contract time and cost outturns

The pre-contract time and cost data on a total of 45 projects were comprehensively reviewed. The projects comprised 12 health projects ranging in capital values from £30m - £200m; 16 school projects with capital values in the range of £12m - £91m; 13 major civil engineering projects worth £25m - £1300m in capital values; and 4 grouped as *Others* which consisted of fire stations, courts, and offices, with capital values in the range of £30m - £300m. The data indicated ***98%*** of the projects had overrun their planned pre-contract times from between ***11% – 166%.*** Thirty six percent (***36%***) of the projects overrun their planned pre-contract times by ***11 – 15 months***. The highest of the overruns were noticed for the schools projects, where one of the projects recorded as high as ***344%*** time-overrun - a total of ***31 months*** of overrun.

Bidding and advisory costs to both the private and the public sectors were found to be equally high ranging from ***£0.1m – £6.0m*** depending on project type and/or size. There were equally substantial overruns on the advisory and bidding costs ranging from ***25%*** to as high as ***200%*** as a result of the continued retention of advisors by both sides during the protracted negotiations.

These results therefore support other earlier findings and concerns that the bidding costs for PPP projects are generally very high compared to the other modes of infrastructure procurement (NAO, 1999; House of Commons, 1996), and that cost and time overruns are problems to the efficient implementation of the PPP strategy. It is for this reason that the second and third objectives of this research are aimed at unearthing the factors that could help in moving the process forward in an efficient manner without compromising on value for money, based on the principles of effective negotiations.

### 1.7.2 The significant influencing attributes on the negotiation outcome

The analysis was based on 49 responses, of which 25 came from the private sector and 24 from the public sector. The projects covered included those of schools, hospitals, civil engineering projects, fire stations and office buildings.

#### *1.7.2.2 Public Sector Client Attributes*

The attributes relating to *technical capabilities* ranked highest, with the key sub-attributes being the ability by the public sector to establish project parameters and prepare output specifications is most significant, strong in-house expertise, sound preparatory work, and clearly established evaluation criteria. The groups of attributes relating to *organisational capabilities* came next with the key sub-attributes being top level commitment, team collaborations, open/frank and flexible communication.

#### *1.7.2.1 Consortium Attributes*

Of the Private Sector Consortium, the group of attributes relating to the *organizational nature and strength* came top. The sub-attributes that ranked high were appointing a dedicated bid manager, the ability to understand what the public sector wants, open and frank communication during the negotiations, involving at an early stage all relevant stakeholders, the ability of the consortium members to work harmoniously, the consortium's readiness to accept risk, and the ability to persevere during protracted negotiations. Those considered to have only minimal effect in pushing the process forward include the private sector consortium taking a proactive role in initiating the project, and experience of previously working with the public sector procurer.

The *quality of the technical proposals* they produce for the bids ranks next, with the key underlying dimension being clarity in the submissions and responses to queries, followed by robustness of outline technical proposals.

*Quality of the financial proposals* ranked third among the key attributes with the most significant underlying dimension being the level of tariff/tolls proposed for the project. The credibility of financiers ranked next followed by the issues of financial

risk exposure relating to both the clients ability to pay for the service being provided, and guarantee that the consortium can provide the services over the long term.

#### *1.7.2.3 Project Attributes*

With regard to the *project nature* attributes, the most significant relates to the size and complexity of the facility. Ease of identifying, assessing and allocating risk is also accorded a high priority. Flexibility in the ability of the project to respond to future changes also ranked high.

Considering the *projects marketability,* high priority sub-attributes naturally include its ability to attract funding and private participation. Other important attributes include the level to which the project meets the needs of the public and the level of tariffs and tolls set.

#### *1.7.2.4 External Environment Attributes*

Group of attributes relating to the *socio-economic* were regarded as most significant, followed by the *political and legal/regulatory regime* environments. Within the *socio-economic environment* the top sub-attribute is the maturity of the financial markets, closely followed by strong relationships between the public and private sectors. Of least significance is the availability of traditional projects,

Within the *political and legal/regulatory regime* environment, clearly defined planning and regulatory frameworks ranked highest followed by well established institutional and policy frameworks, and the acceptability of the PPP philosophy to the general public.

### 1.7.3 Perceptual differences between the Public and Private Sectors

The research did reveal that there was a strong agreement between these two main stakeholders involved in the in the PPP procurement strategy about the relative significance of the main centres of influence on the pre-contract processes and the negotiation outcomes. However at the sub-dimensional levels some significant differences in perception were revealed by the study, especially within the dimensions

for the Public Sector Client Organisations and the Private Sector Consortium and. These differences are outlined as follows:

### *1.7.3.1 Consortium Attributes*

Attributes relating to the *Organisational Nature and Strength* of the private sector consortium are the source of most differences in opinion. Eight (8) of the nineteen (19) sub-attributes in this category were ranked quite differently by public and private sector respondents. The key sub-attributes on which there were differences are:

- *Open and frank communications during negotiations*
- *Early involvement of stakeholders*
- *Readiness to accept risk*
- *Consortium's previous experience in PPP procurement*
- *Willingness to commit to earlier negotiated terms*
- *Ability to tie equity into the project for a long period of time.*
- *Experience of consortium previously working together as a team.*
- *Ability to obtain planning permission timeously*

In contrast, there was full agreement on the relative importance of those attributes related to the *quality of bidders technical and design proposals*. The quality of the financial proposals category highlighted some differences in opinion on relative importance of individual attributes, but no substantial differences in their relative significance index.

### *1.7.3.2 The Public Sector Client Attributes*

Regarding public sector client attributes, there was broad agreement about ranking of importance for the various main-attributes. Significant differences were noted on 5 out of 12 sub-attributes under their organisational capabilities. These were:

- *Ability to accept and absorb risk.*
- *Ability to effectively sensitise public opinion on project.*
- *Existence of established PPP unit.*
- *Tapping knowledge and expertise gained elsewhere.*
- *Ideal attitude to cost.*

Of the technical sub-attributes, differences in perception existed on:

- *The use of standard bidding documents*
- *Previous experience in PPP project procurement*

Differences on perception were also noted on two of the financial capability sub-attributes. These were:

- *Ability to raise bonds*
- *Ability to provide flexible tax regimes*

## 1.8 Areas for Further Research and Limitations of the Research

One main area identified for further research is the need to thoroughly examine the cultural variability dimensions of the hierarchical model if it is to be interpreted with a global perspective. This is due to the fact that negotiations are carried out between individuals or a group of individuals and that an individual's perceptions and attitudes are greatly influenced by the culture within which they grow and develop. People are social beings and our values and behaviour are greatly influenced by our social and cultural environment. The fact is that negotiation represents a microcosm of our broader social milieu; negotiating behaviour is therefore regulated by societal norms making cultures to differ a great deal across countries. The model therefore needs to be tested with data obtained from other countries.

## 1.9 The Structure of the Thesis

The thesis structure is outlined in Figure 1.3 below.

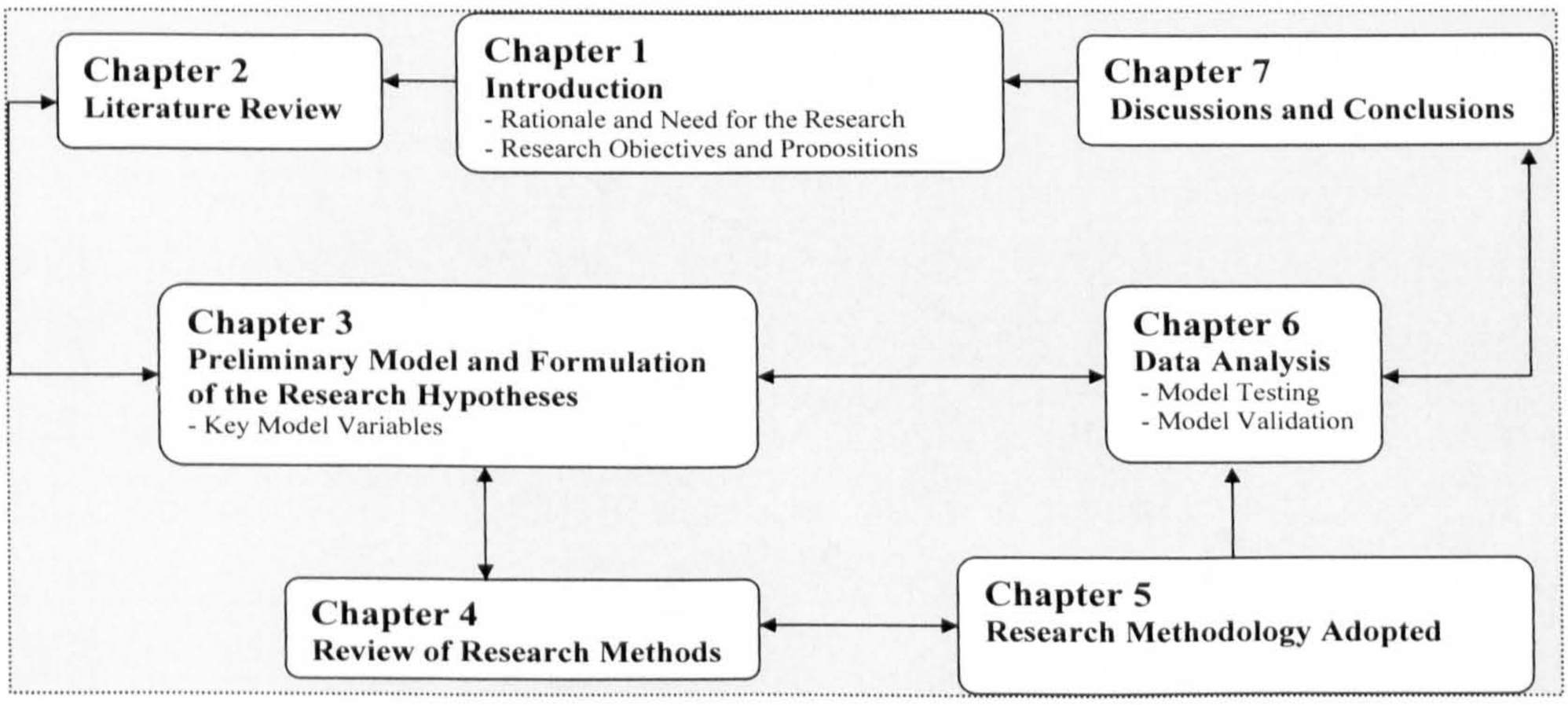
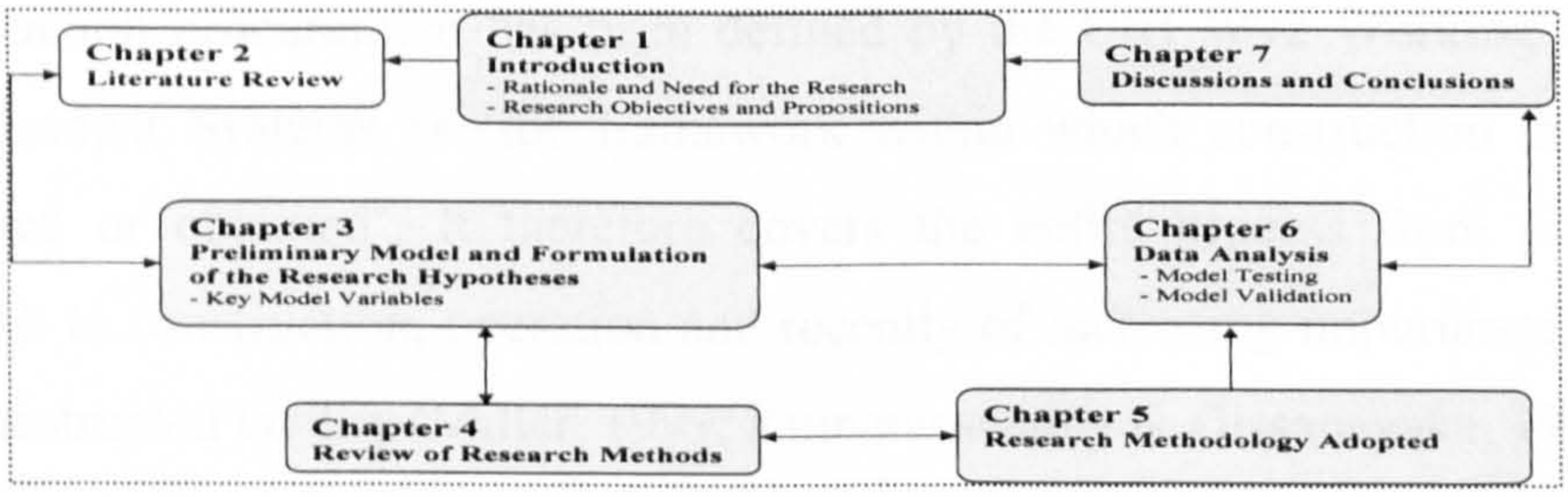



**Figure 1.3 Thesis Structure**

The structure therefore provides a clear outline of the how the entire research has been conducted and documented.

# Chapter 2 Literature Review





# Chapter 2 Literature Review

## 2.1 Introduction

The literature review has been presented in two main parts. The first part looks at the PPP procurement by briefly tracing its evolution; its strategic relevance; the process as it is practiced in the UK, highlighting some of the difficulties associated with the process especially the overwhelmingly excessive pre-contract time and cost overruns. The second part provides a thorough review of the literature on bargaining and negotiation, the theoretical foundation around which the preliminary model has been developed in Chapter 3 for the main research theme. Insight is provided into what is meant by contract negotiations, the two main types of negotiating strategy, and the interplay of the characteristic features and factors that influence the negotiation process and outcome. The theoretical issues relating to contract negotiations have been reviewed including the influencing characteristics of how deadlocks and delays could be avoided during negotiations.

# PART A: Infrastructure Procurement and the PPP Concept

## 2.2 An Overview of Infrastructure Procurement

Infrastructure refers to the whole stock of capital and facilities for the production of public goods. The term infrastructure is therefore used in the broad sense to include facilities that provide for the transportation of people, goods and information; the provision of public services and utilities such as water, power and the removal and minimization of waste, including general environmental restoration. On the other hand, construction procurement has been defined by the CIB W92 Working Commission on Procurement Systems as 'the framework within which construction is brought about, acquired or obtained'. It therefore covers the entire process from project definition through to construction, operation and recently of increasing importance, the disposal of the constructed facility (Miller, 1999; Kumarasawamy & Dissanayaka, 1998; Kim, 1997).

As indicated in Figure 2.1 the procurement systems within the construction industry were thought to have evolved around the traditional form which started around the end of the 18th century when the architect was recognized as the independent designer and manager of the building process. In recent years however, new and innovative systems have evolved in the forms of design and build, management contracting, construction management, etc. reflecting the increasing integration of design and construction including even the financing and maintenance of the constructed facility (Miller, 1999; Rowlinson, 1999).

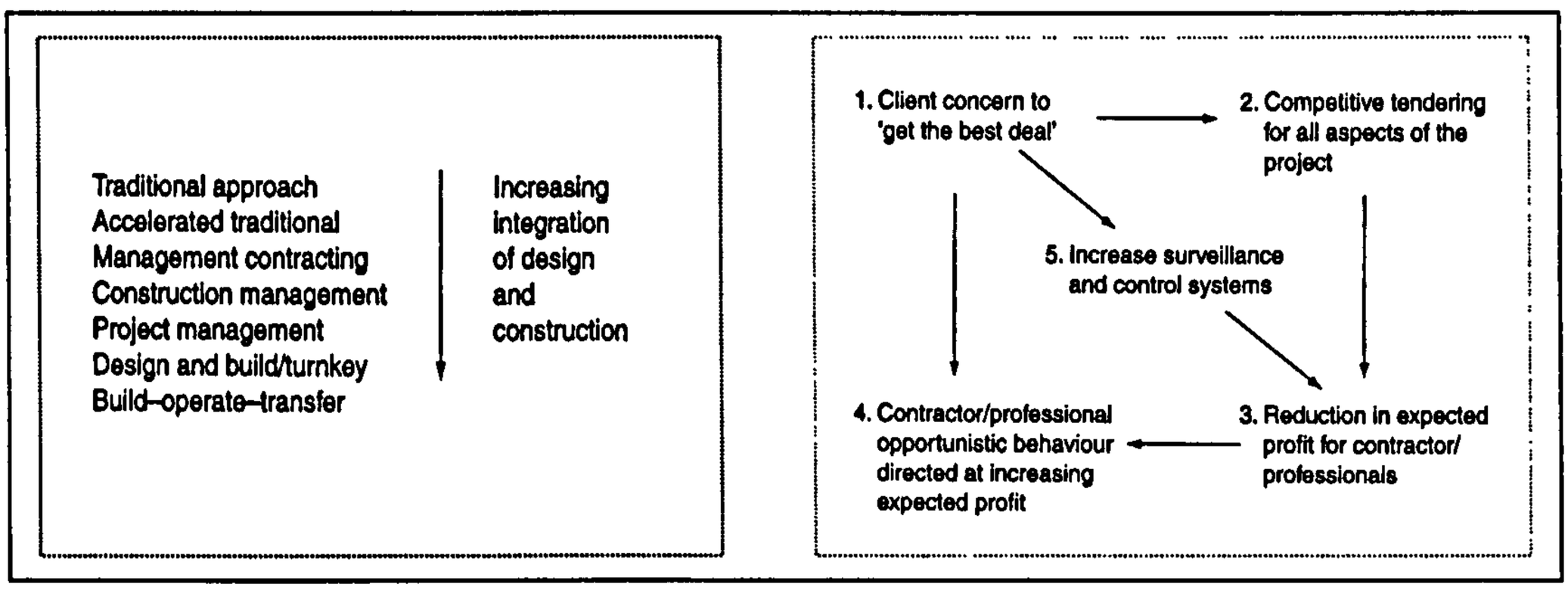



**Figure 2.1 Forms of procurement systems and the vicious circle of construction procurement**
Source Adapted from Rowlinson (1999 p 35)

These innovative changes have been spurred on by what Rowlinson (1999) described as the vicious circle in construction procurement when from the 1860s in the UK for example, the state began to play a significant role as the client of the construction industry, from which time competitive tendering became the norm. Then came the growth of the independent professions within the industry seeking to protect the interest of the client; thus in effect establishing a reward and penalty structure for the actors in the industry (Winch, 2000). From then on, most if not all, publicly procured projects were contracted out competitively on the basis of bills of quantities prepared from full working drawings and elaborate specifications. The lowest tender price then significantly became the basis of assessing value and the choice of contractors. This approach has of late been observed as not only acting as a constraint on contractor's ability to innovate but also

adversarial and thus contributing to inefficiency and lack of growth in the industry (Latham, 1994; Egan, 1998). The result was that as clients tried to push down their production costs, they saw their transaction costs rather rising in the form of fees to additional professional hands to protect their interest (Curtis et al, 1989; Cooney, 1993).

The industry analysts have observed that due to the very diverse and complex nature of the production process within the industry, with transaction between many actors and the existence of a series of value chains, the development of a close relationship and the establishment of good atmosphere in the transactions would reduce costs (Bremer and Kok, 2000). Various forms of arrangements have therefore emerged within the industry for the procurement of infrastructure projects and services, each of which introduces interrelationships that are governed by both contractual and tortious linkages that are strengthened by various forms and conditions of contract such as the ICI and FIDIC for civil engineering contracts and the JCT for building contracts.

Figure 2.2 provides a pictorial view of the various types of procurement strategies and the range of organizational variations to the management of projects within the construction industry.

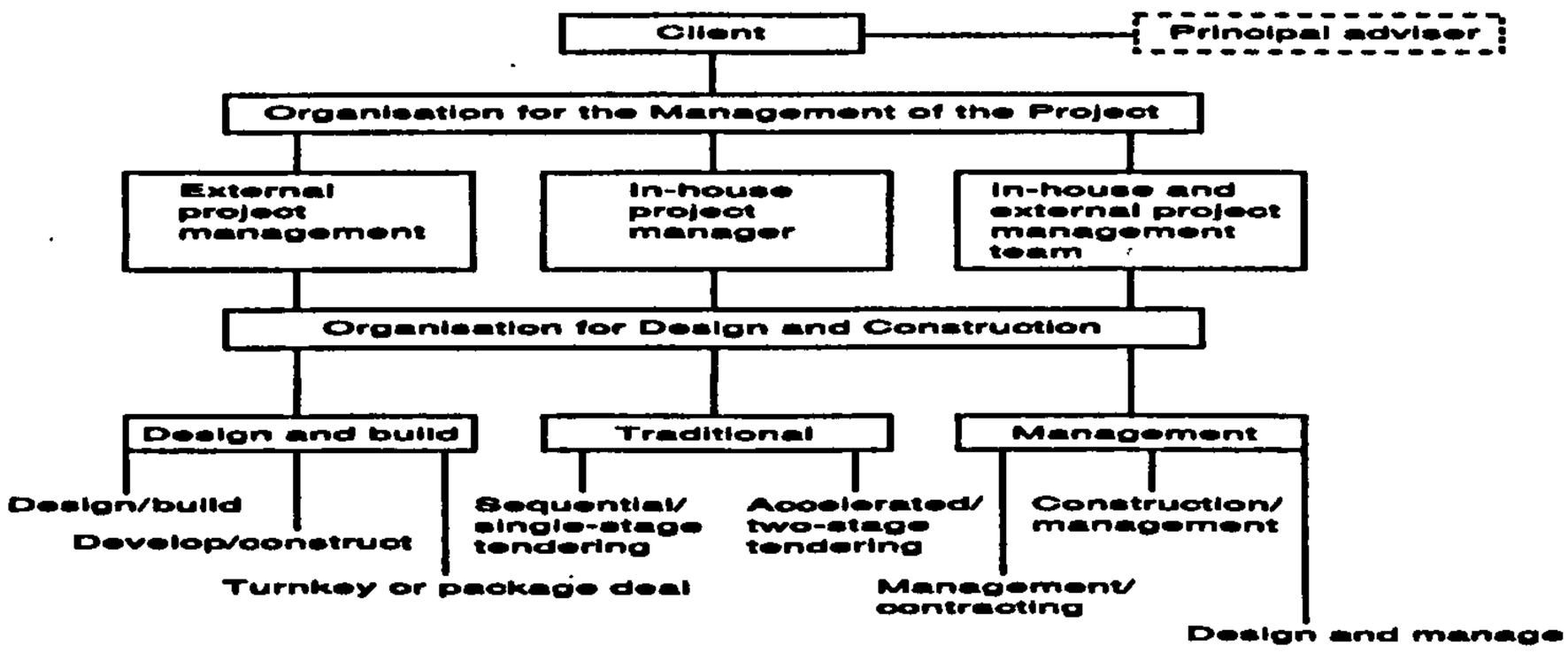



**Figure 2.2 Procurement systems and variants of Organizational management of projects**
Source: Turner (1997 p 44)

## 2.3 The state and infrastructure procurement

The evolving participation of the state in economic enterprise has been covered extensively in literature (Kerr, 1998; Griffin 1999). Prior to 1945, state enterprises were exceptions; the private sector was dominant even in such areas as canals and rail development in the 17th and 18th centuries (Walker & Smith, 1995). Prominent among some of the early private sector infrastructure concession projects included the water supply and distribution concession contract granted to the Perier Brothers in France in 1782, the concession contract for the Suez Canal granted to Campagnie Unversalle de Suez in 1854 (Owen, 2002).

However state involvement in infrastructure development started becoming more prominent after 1945, as the state in a bid to improve social welfare after the great depression of the 1930s, increasingly took on the responsibility of massive investments in state enterprises and the nationalization of private ones. In the UK for instance, government's share of the estimated £55b annual output of the construction industry alone is 40% (Graves *et al*, 2000). No doubt the demands upon governments to achieve rapid growth, to improve social conditions in urban areas, to improve health and education, and so on, is beginning to exceed the resources of the state and its managerial capacity. Whereas public sector net investments have been declining in some instances, rapid population growth particularly within the urban settings is exerting enormous pressure on existing infrastructure (White, 2001; Ahadzi & Bowles, 2001a; Office for National Statistics (UK), 2000; HM Treasury, 1998).

With capital costs for infrastructure projects becoming increasingly more expensive, coupled with the intense competition for the alternative use of available fund and the global easy access to knowledge and free movement of money across borders, the thinking had started changing from the 1960s however towards a search for 'best practice' in construction procurement. This has led to the introduction of such innovative procurement strategies as selective rather than open competitive bidding, management contracting, package deals, design-build and novation. Other strategies include more collaborative and win-win approach to construction procurement in the forms of

partnering, forming teams that can focus on adding value and improving profitability of individual companies through efficient working, promoted in the main by the private sector clients (Turner, 1997; Cox and Townsend, 1998). Increasingly, the awareness also began to dawn on the public sector which has the largest construction spend to improve efficiency in the procurement of projects and obtain value for money.

Interestingly however, amidst the growing difficulty of governments to invest in public infrastructure due to lack of the necessary investment capital, the recent years have witnessed a phenomenal growth both in numbers and in the amounts of money held by private individuals. It has for instance been estimated that assets owned by individuals with more than a million dollars each in the banks will double between 1997 and 2005 to a total of $40 trillion world-wide (FT, 2001a). Private equity firms in Europe for instance raised a record amount of €48bn in 2000, up 89 percent from a year earlier (FT, 2001b)

The combined effects of these developments, i.e. the ever increasing demand on public infrastructure, the lack of requisite public funds to invest, and the recognition that the private sector has the financial, managerial and technical potentials, coupled with the realization that the state still needs to retain some substantial role in the provision of these services, set the stage in the early 1990s for a new strategic rethink in public procurement - ***the Public-Private Partnerships (PPP)***. The basic principle behind this strategic rethink is that state departments are to be transformed from being owners and operators of state assets into the purchasers of services from the private sector. The private sector becomes long-term providers of services which they deliver by taking the responsibility for the design, construction, financing and the operation of the assets.

In the UK for example, in order to encourage value in government procured construction projects, the New Public Management system was adopted in the early 1990s as a way of reorganizing public sector organizations to bring their management reporting and accounting procedures closer to business methods, leading to some form of deregulation designed to promote sensitivity to market pressures (Hall and Holt, 2002). These developments and policies led to the launching of the Private Finance Initiative in 1992.

Infrastructure services can be grouped into two broad categories – the recurrent cost of providing services such as water, sanitation, garbage collection and other services whose direct beneficiaries are readily identifiable and can therefore be readily financed through user-charges, and other services such as drainage, schools, roads, for which charges cannot be directly passed on to the beneficiaries should be financed from general taxes and other revenue sources (Kim, 1997). In 1998 alone, an estimated total of $3 trillion was spent on construction worldwide (Crosthwaite, 2000). Public sector expenditure incidentally constitute the largest proportion of these massive construction spends.

Estimates by the World Bank indicate that within Asia alone, demand for infrastructure investment for the period 1995-2004 will amount to US$1,262 billion (Ong and Lenard, 2001). However, national budgets derived from revenues and taxes alone cannot meet the rather huge investments required to either built their national infrastructure or renew the decaying ones without critically sacrificing those other vital areas as welfare, health and education. In order to promote economic growth, governments all over the world are therefore constantly seeking alternative procurement strategies to finance the development and renewal of their national infrastructure in order to more efficiently redirect these huge chunks of their national revenue that goes into the provision of infrastructure into other areas as the environment, welfare and health in order to promote economic growth and stability.

The huge demands for infrastructure development are attributable to the fast population growth particularly within the urban settings of the world. The populations of the world's megacities are expected to increase at phenomenal rates between now and the year 2015, with some cities, especially those in the developing countries, such as Jakarta moving from a mere 2.8 million people in 1950, and 9.5 million in 2000 to an estimated level of 21.2 million in 2015. Cities of the developed world are no exemptions as the population of Los Angeles for instance is expected to grow from 4.0 million in 1950 to 14.2 million in 2015 (Baker D. and Newton, D., 2001). These high levels of population explosion as shown in Figure 2.3, have brought not only chaos on a number of highways in these

major cities, but increasing pressure on all other public utilities and services including health and education.

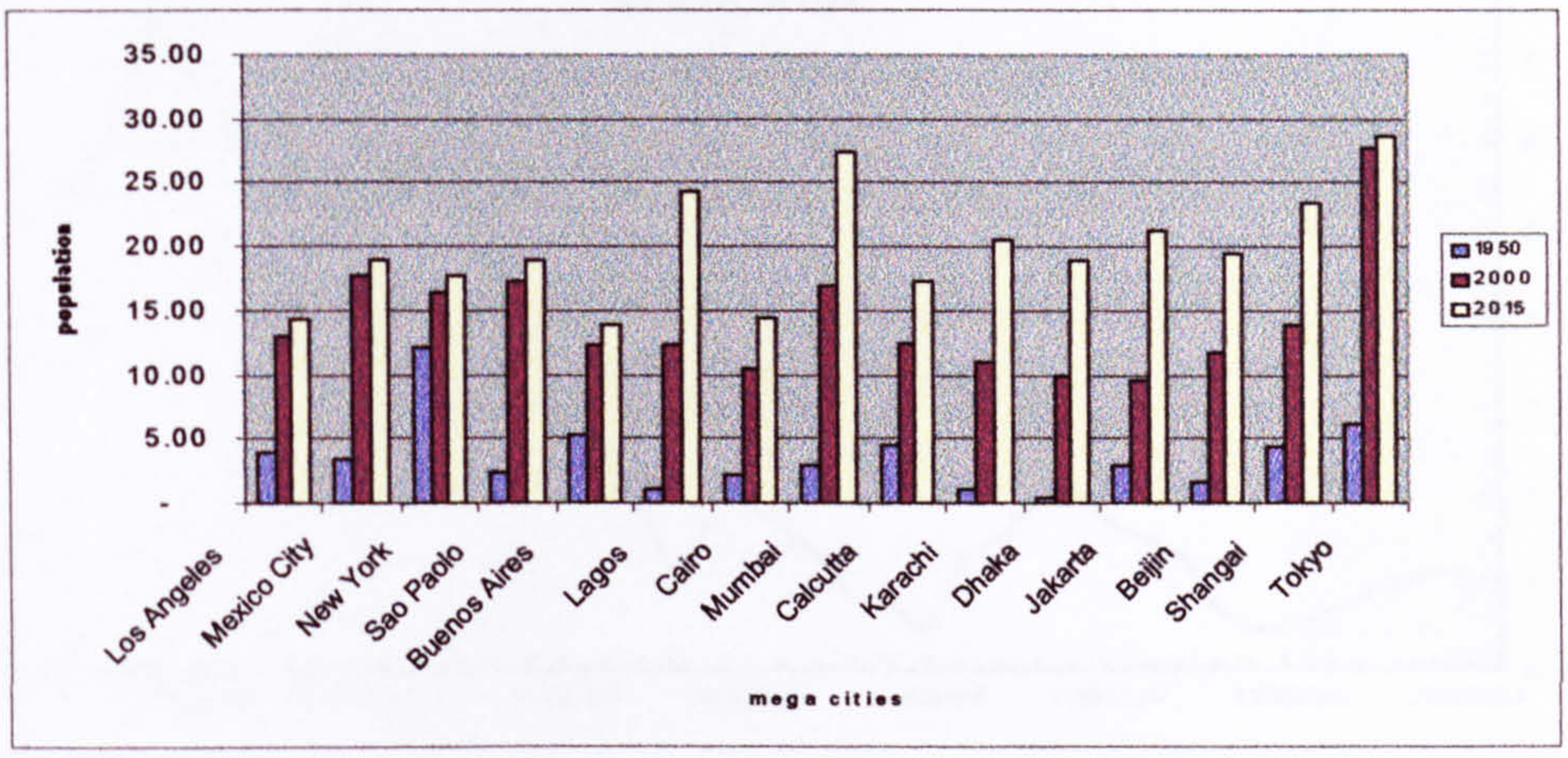



**Figure 2.3 Population growth patterns of mega cities (in millions)**

Data source: Financial Times of London, 3rd March 2001.

Iain White (2001), writing on the situation in Delhi (India), painted a vivid picture of the typical chaotic conditions on the roads in most of these fast growing cities – *'a two-lane highway reconfiguring itself into five-lanes of chaos with every one giving way to the might of lorries and buses and nobody taking notice of pedestrians'*. Similar pressures are being felt by other public sector facilities such as education and health.

There is also the growing recognition within the developed world that their countries' infrastructure needs urgent renewal and modernization. It has for instance been estimated that traffic levels on UK roads will continue to rise from a level of 455 billion vehicle-kilometres in 1998 to 478 billion in 2001 and 524 billion in 2006 (Office for National Statistics, 2000). This phenomenon will thus put increasing pressure on the existing road infrastructure and increase traffic congestion which has been estimated to be costing a colossal sum of over £20 billion annually within the UK (Kinnock, 1998). The question then is where does the needed investment come from to rehabilitate and build the infrastructure which has been recognized as decaying rapidly. Public sector net

investments have rather been declining over the years due in part to the difficulty of raising income through taxes. Figure 2.4 portrays a vivid picture of this for the UK.

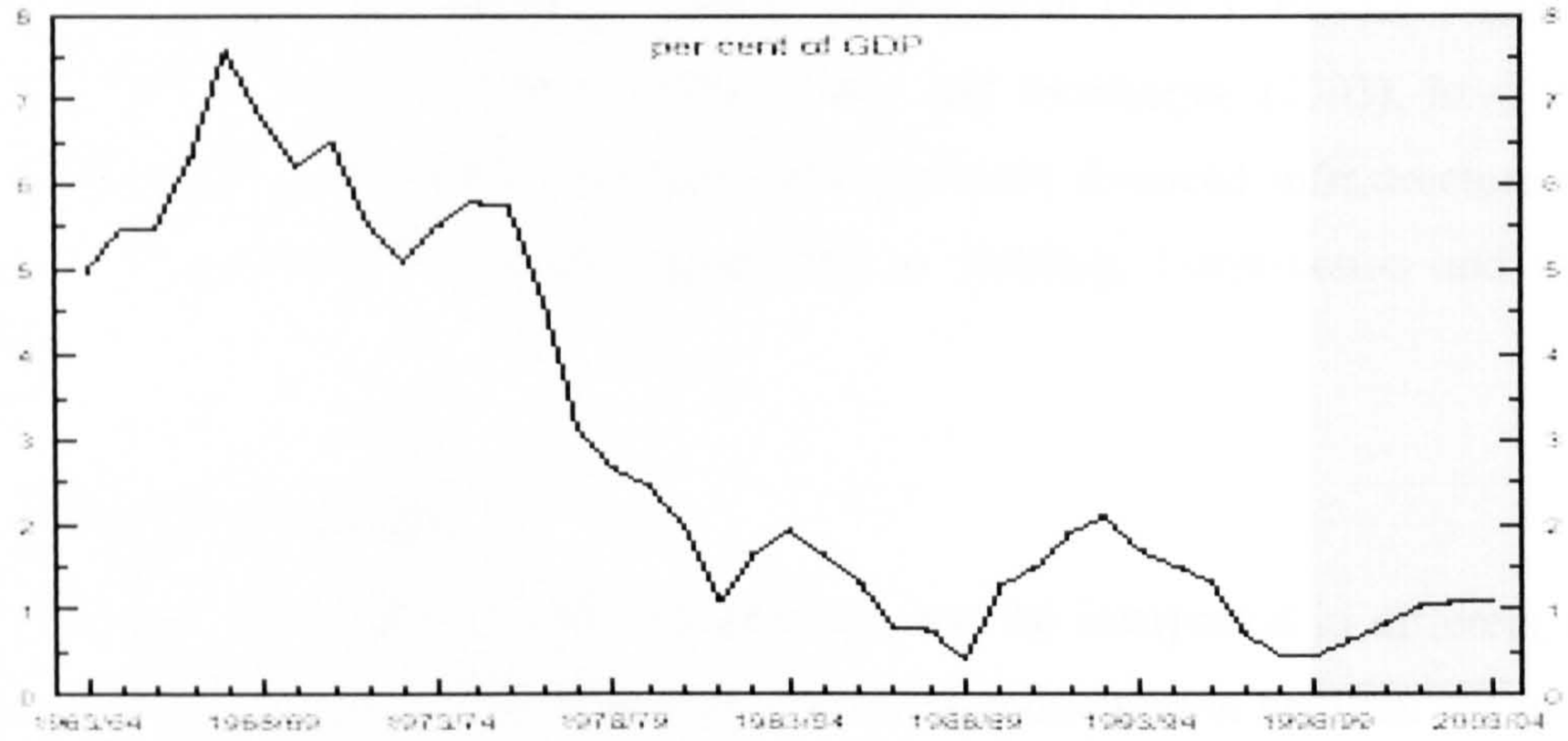



**Figure 2.4 UK public sector net investment**
Source: HM Treasury (1998)

Within the developing world also these high demands for infrastructure development coupled with the pressures on national budgets is making governments to move towards encouraging private sector to invest in infrastructure projects in the forms of Build Operate and Transfer (BOT), Build Operate Own and Transfer (BOOT), Build and Transfer (BT), Design Build Finance and Operate (DBFO). Tam (1999) indicated that while some of the projects emanating from these arrangements have proved quite successful such as the Cross-Harbour Tunnel, the Western and Eastern Harbour Crossings all in Hong Kong, others such as the Bankok Elevated Transport System, the Second Expressway System and the Don Muang Tollway all in Thailand were saddled with problems due to the nature and amount of risks the projects were exposed to. Others included the cancellation of power project agreements in Pakistan, renegotiations of power and water agreements in India and Argentina respectively, (Wells, 1999; Tam, 1999). These problems have begun to raise concern among the large investment organizations such as the World Bank to start organizing international conferences to discuss how best to confront the problems (Salinger, 1999).

The Public Private Partnership mode of procurement strategy cannot therefore be said to be immune from the risks generally associated with infrastructure procurement. In fact

the risks are rather exacerbated due to the high capital outlays involved and the long-term nature of this procurement strategy. Wang et al (2000), Ozdoganm & Birgonul (2000), Tam (1999), Treasury Taskforce (1997), Songer *et al* (1997), Private Finance Panel (1996a), UNIDO (1995), Drake (1994), Yates and Mukherjee (1993), have variously identified the key risk areas associated with privately financed infrastructure projects. These risk areas can be broadly categorized as Bidding, Construction and Operating Risks.

## 2.4 The PPP Concept

Although the term Public Private Partnerships may be interpreted in different contexts from country to country, it is essentially a form of collaboration between the public and private sectors. A classical definition is therefore provided by the Canadian Council for Public-Private Partnerships as: " *A cooperative venture between the public and private sectors, built on the expertise of each partner, that best meets clearly defined public needs through the appropriate allocation of resources, risks and rewards"* (CCPPP, 2001 pp v). The basic principle is that state departments are transformed from being owners and operators of assets into the purchasers of services from the private sector, with private sector becoming long-term providers of services which they deliver by taking the responsibility for the design, construction, financing and the operation of the assets.

The entire PPP procurement process may be broken into four main stages; i.e. the Planning and Feasibility phase, the Bidding and Negotiation phase, the Construction phase, the Operation phase and possibly the Transfer and/or Renegotiation phase as shown in Figure 2.5 below.

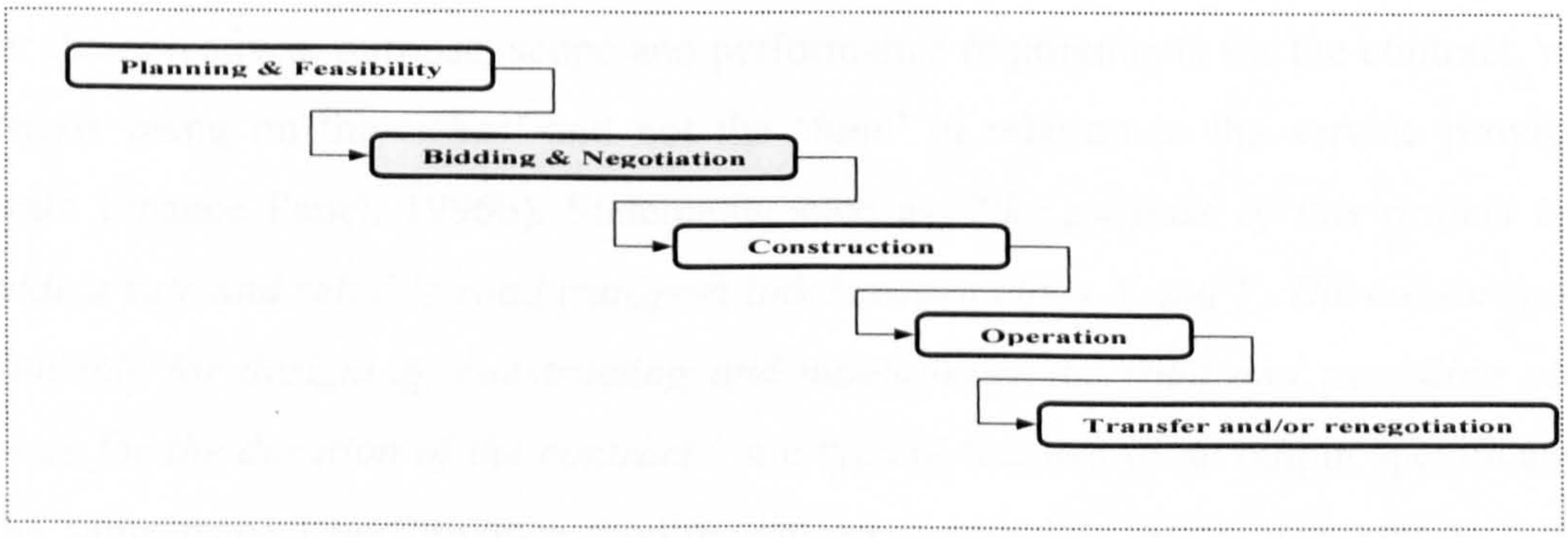



**Figure 2.5 Stages of the PPP project procurement**

Figure 2.6 also provides a decision flow chart of the PPP procurement process.

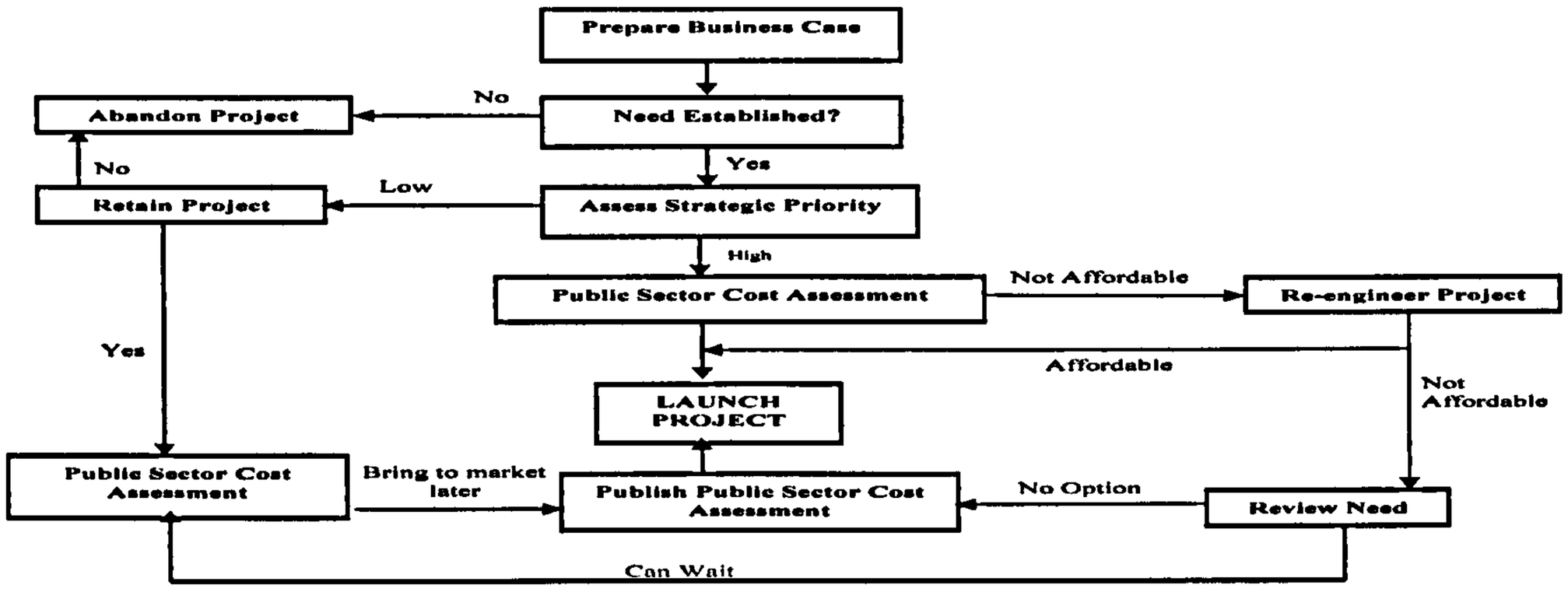



**Figure 2.6 PPP procurement decision chart**
Source: Adapted from Private Finance Panel (1996a) *PFI in Government Accommodation p6*

## 2.4.1 Traditional vs. PPP project procurement

A PPP project structure is expected to have a scope to allocate risks to the private sector for efficiency benefits to be generated across the life of the project and also allow the private sector to innovate and design away risks that bring new ideas to the way the service is provided. The project should thus have substantial operating content, a clear boundary and measurable output performance. Paramount to all these is the principle that the risks transferred to the service provider are commercial in nature and controllable (Treasury Taskforce, 1997)

In PPP procurement, while the public sector no longer takes responsibility for the design, it rather specifies its services by way of output specifications which are only frozen before the submission of the best and final offer (BAFO). These output specifications cover the objectives, purpose, scope and performance requirements for the contract, with emphasis being on the '***what***' and not the '***how***' in relation to the service provision (Private Finance Panel, 1996b). Statements such as: "*the purpose of this project is to provide a safe and reliable road transport link between cities X and Y. The consortium is responsible for designing, constructing and maintaining the road and providing other services for the duration of the contract*", are typical features of an output specification. In the same respect performance requirement are detailed in terms of operating output

and not how the performance will be achieved such as the *'pavement surface shall be free of pockets of water during and after any rains.'*

Figure 2.7 provides an illustrative distinction between Capital Asset procurement and PPP procurement.

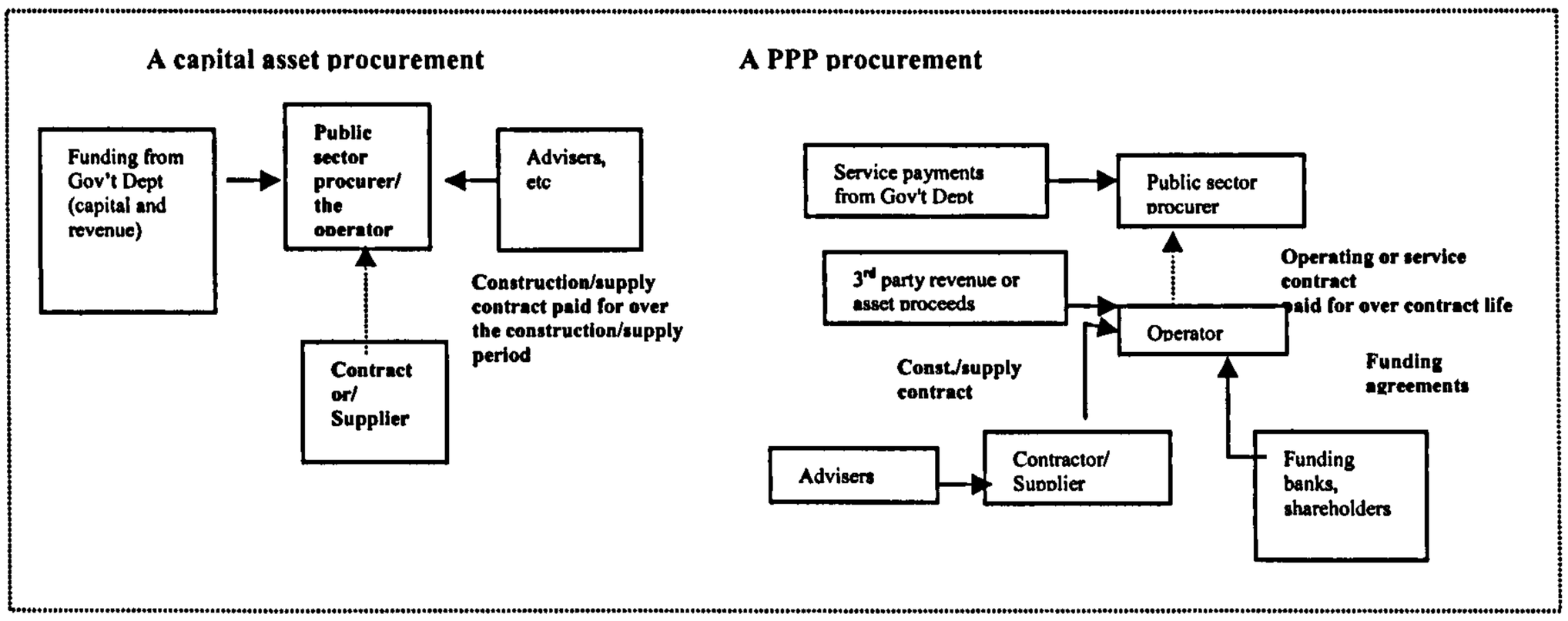



**Fig 2.7Capital Asset Procurement v PPP Procurement**
Source: Private Finance Panel (1996c) *Risk and Reward in PFI Contracts p 3*

A distinctive feature of the PPP procurement is the linkage of payments directly to performance and quality. As noted by Williams (1995), the service level of any PPP/PFI project agreement can be said to be the 'teeth' of a PPP deal, and therefore the trigger for remedies and the primary tool for withholding payment to the service provider in the event of default. This link is as shown in Figure 2.8

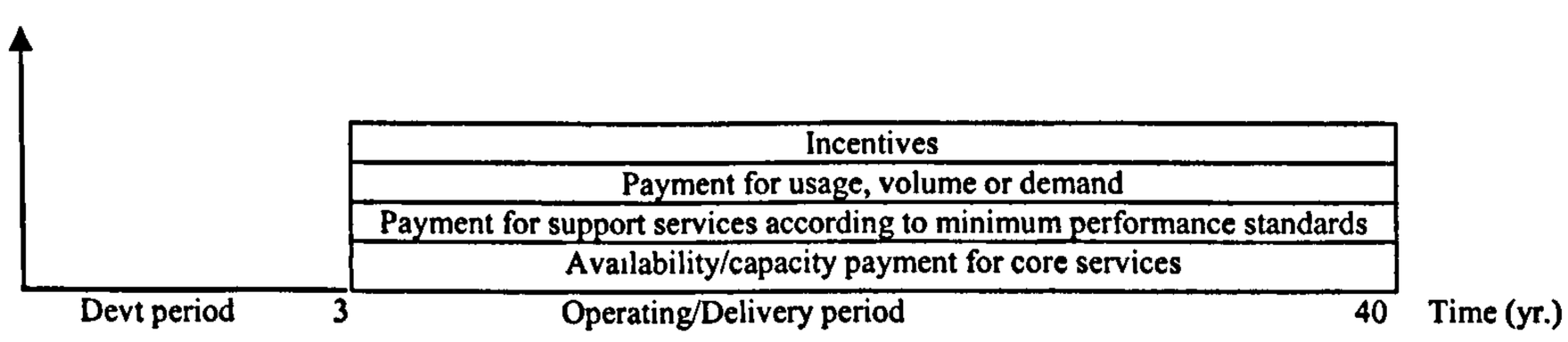



**Figure 2.8 Payment mechanisms in PPP/PFI procurement**
*(Source: adapted from PFP (1996a)* Risk and Reward in PFI contracts p 9*)*

Table 2.1 provides a characteristic overview of the PPP procurement process as opposed to the traditional form.

**Table 2.1 Key differences between tradition public sector procurement and PPP**

| Area of consideration | Traditional public sector procurement | PPP procurement |
|---|---|---|
| Duration of private sector involvement in the project | Until construction of the facility is complete (plus the defects liability period) | Normally for at least 20-40 years for construction related PPP projects |
| Specific company involvement | Appointed by the public sector client on an individual basis for the supply of the specific skills | Involved as part of a concessionaire consortium with all the skills necessary or taking a key supply contracting role, being appointed by the bidding firm or concessionaire |
| Private sector risks | Specific to the area of involvement and limited to the defects liability | Wide ranging and long term |
| Remuneration | Lump sum or percentage fee | Annualised payment |
| Opportunity for private sector to suggest improvements | Limited | Considerable |
| Key financial considerations for the private sector company | Maintaining a positive cash flow and margins | Having an adequate asset base and debt facility |
| Attitude require of the private sector from the public sector | Reactive | Proactive |
| Responsibility for design, build, finance and operate | Lies with the public sector procurer | Lies with the private sector concessionaire |
| Accountability for the resulting services | Public sector procurer is accountable to itself/Parliament | The private sector concessionaire is accountable to the public sector procurer who in turn remains accountable to Parliament for the services provided. |

**Sources**: Adapted from CIC (1998) & Private Finance Panel (1996a)

The contractual relationships within the PPP/Privately Financed schemes can generally be complex. This is due to the very large number of stakeholder involvement. Figure 2.9 provides a picture of the contractual relationships within a typical Privately Financed Scheme.

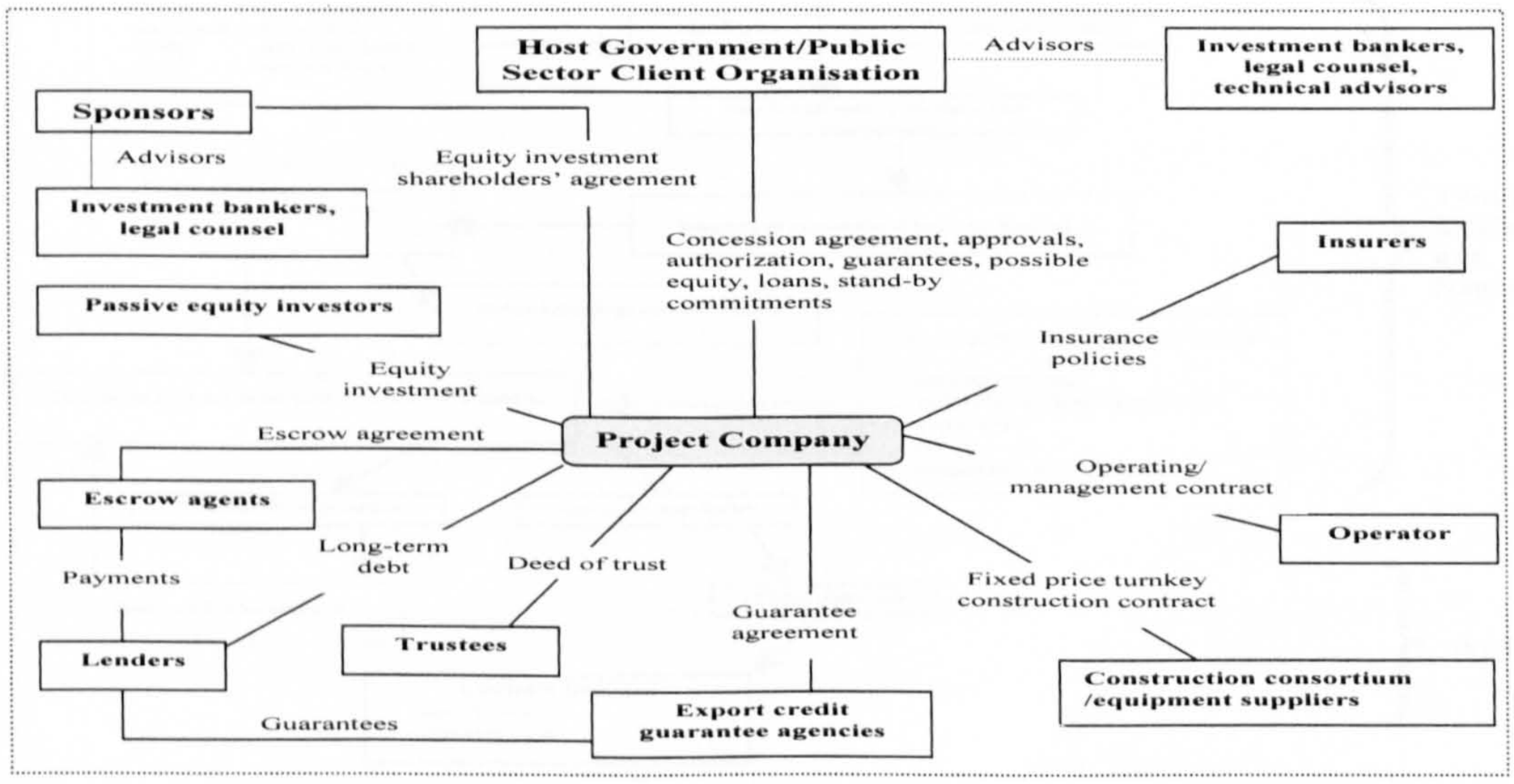



**Figure 2.9 Typical Contractual arrangements for a Privately Financed Project**

Source: Adapted from Walker and Smith (1999 p10)

At the core of the whole process is the project company which may be made of a conglomeration of companies coming together to form the Consortium, which in some instances are referred to as the Sponsors. The project company enters into the main agreement with the public sector client organization for the provision of the services required. Further arrangements are made with other specialist agencies for the construction and supply of specialist equipment, and for the operating of the facility, including entering into agreements with lenders, equity investors and insurance companies.

### 2.4.2 The Bidding and Negotiation phase of PPP procurement

Figure 2.10 provides an outline of the Bidding and Negotiation phase of the PPP procurement process within the UK - the stage which forms the main focus of this research. At this stage of the process all the key players will begin to exert significant influences.

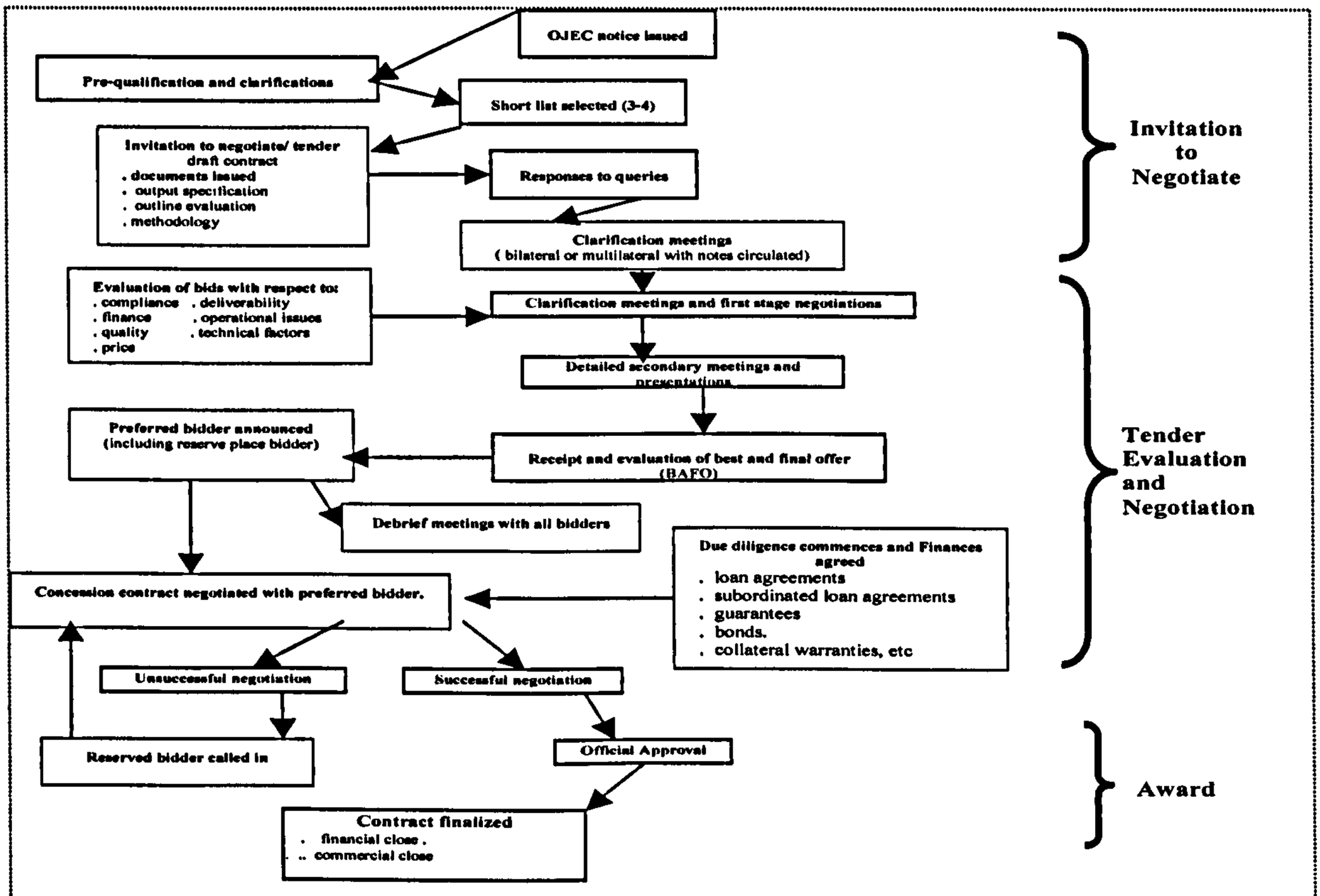



**Figure 2.10 The PPP procurement process up to financial close**
Source: Ahadzi & Bowles (2001a)

The very complex nature of the process no doubt has generated risks of pre-contract time overruns and high bidding costs. The research would identify the key attributes that help in making the process smoother and therefore add to the needed knowledge in managing the process successfully.

### 2.4.3 Interactions between the parties within the PPP contract relationships

The interaction between the public sector client and the private sector service provider under the principles of the PPP project procurement could be likened to that of a buyer and seller in the realm of commerce for which a number of models have been developed. One of such models is termed the *problem-solving model* which provides the opportunity for the seller to analyze the buyer's problem to come up with solutions after evaluating possible alternatives (McCall and Warrington, 1989). The model presupposes prior study of the buyer's business, the sector he/she operates in, and the existing economic and competitive conditions affecting the buyer's problem.

The problem solving model focuses on the needs, attitudes and values of the buyer. These three elements form the hallmark of any sound PPP procurement. The approach is considered appropriate where there is a diversity of needs to be met, where the product or services are complex and the unit transaction is high. The model thus relies on the expert knowledge of the seller and as well as the ability of the buyer to express his/her needs very clearly and practically. Such a mutual role-taking is not only a necessary prerequisite for effective communication and successful interaction but also their ability to tap into the appropriate power bases for their particular situations. Their respective organizations' derived resources, such as reputation, reinforce this power, including the authority invested in them to vary the price and the delivery terms. The negotiation process under such circumstances tend to take account of the differences that can arise out of a situation of mutual dependence, and hinges on the exchange of resources related to such items as specification, service levels, technical advice and price. Additionally, where there is a concentration of strength through centralization of the buying function, such as those found in the Highway Agency and the NHS, the organizations eventually

develop increased power from the greater knowledge of supplier's product, processes and capabilities.

The interactions between the parties to PPP project procurement could also be influenced to a large extent by what Robinson and Faris (1967) identified as the *buy-phase model* in commercial transactions. This relates to three types of buying situations.

a) the *new buy* where the need for the product/service has not previously arisen, so there is no experience in the buying organization and a great deal of information is required;

b) the *modified re-buy*, where a regular requirement for the type of service/product exists and the buying requirements are known, but sufficient change has occurred to require some alteration to the normal supply procedure;

c) the *straight re-buy*, where a routine procedure exists and there is an approved list of suppliers.

According McCall and Warrington (1989), there is evidence to show that the buying process will be longer and more complicated if the products or services being purchased are new and custom-built rather than routine.

Again, the PPP pre-contract procurement process as earlier outlined in Figure 2.10 could be likened to the buying process classification developed by Hill and Hillier (1977). Hill and Hillier viewed the buying process as key decision points which consist of four main stages:

i) the precipitation decision stage;
ii) the product/service specification stage;
iii) the supplier selection stage;
iv) the commitment decision stage.

Each of these stages comprises individuals most of whom are unlikely to be included at all the stages and as the stages move from one to the other, there is increasing restriction on the freedom of decision-making activities. These individuals may in fact take policy decisions which can limit and affect the later decisions.

The mix of people involved, the nature of the procurement process, the nature of the services/product and its use, the reason for its purchase, and the behavioural characteristics of the participants, all combine with other external/environmental factors to determine the buying and hence the negotiation behaviour and to underline its complexities. The PPP project procurement requires extensive relationships where the need for change is typically perceived within the relationship. A critical aspect of the management of these relationships is the extent to which the parties can balance their relationships with each other, a process which may have a profound influence right at the negotiation stages. This is principally due to the fact that each party will attempt to define and capture their respective roles and obligations within the relationship including the expected benefits to be derived from taking on certain risks.

### 2.4.4 The global perspective of the PPP philosophy

As a result of the introduction of the PPP procurement strategy, a number of funding options are now available to national governments all over the world for the provision and maintenance of public and social infrastructure as shown in Figure 2.11.

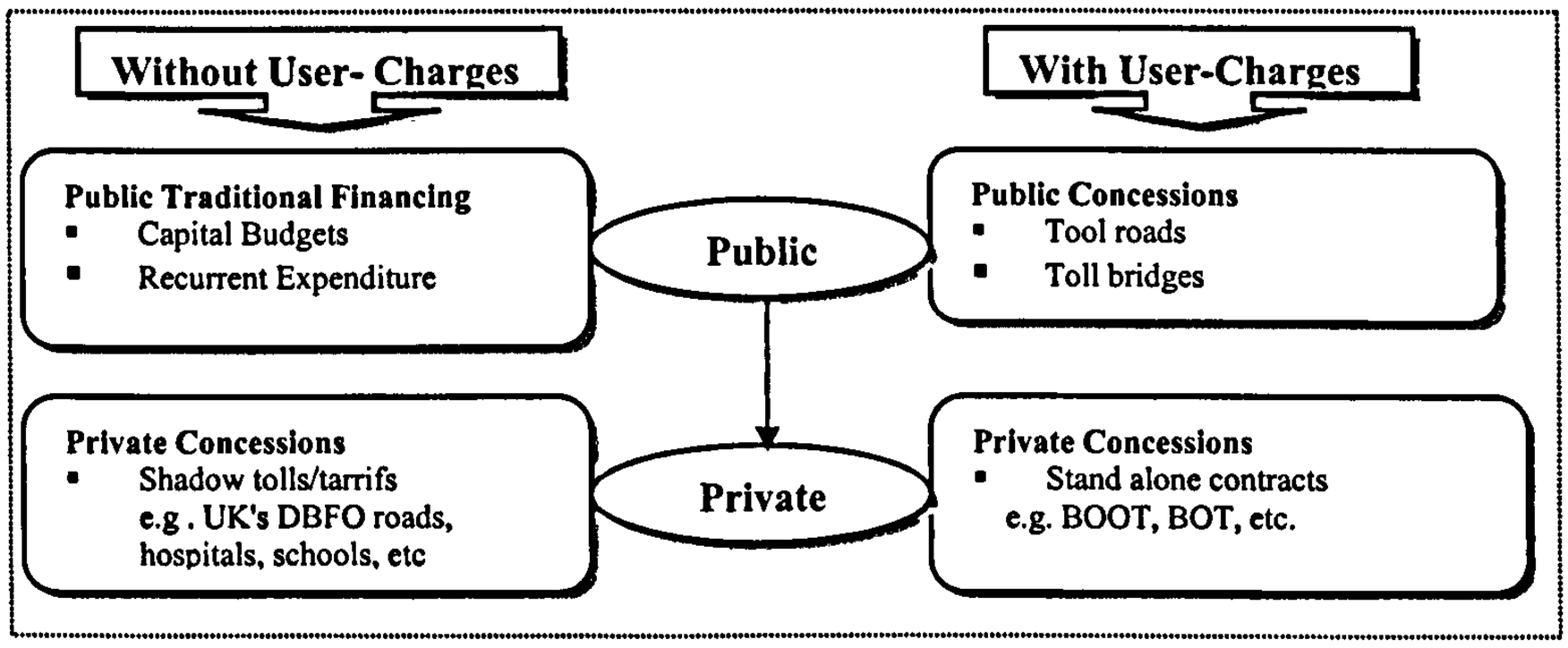



**Figure 2.11 Funding options for public infrastructure**

The PPP concept, including other variants such as BOOT, BOT, etc, of procuring social infrastructure in partnership with the private sector is therefore increasingly being embraced by a number of countries and supported by a number of international

institutions. Prominent among them are the USA, the UK, Canada, Australia, South Africa, Japan, Finland, the World Bank, the European Investment Bank, and the UN (The PFI Report, 2001; Hamilton, 2001; Brook; 2001; Kouvarakis, 2001; Leiringer, 2000). Table 2.2 provides a brief overview of the above the rate at which countries all over the world are adopting the strategy.

**Table 2.2 The PPP/Private Finance landscape**

| Country/Institution | Types of projects/activities |
|---|---|
| **United Kingdom** | Formally launched through the Private Finance Initiative in 1992, the following represent the types and number of projects implemented through the strategy by 2000;<br>Educational facilities : schools - 59 projects; colleges - 29 projects<br>Healthcare - 164 projects; Prisons - 12 projects<br>Police - 21 projects; Fire Services -5 projects<br>Armed Forces - 20 projects; Hosing & Offices - 17 projects<br>Water and Sewerage - 10 projects; Waste Management - 17 projects<br>Roads - 15 projects; Bridges - 3 projects<br>Railways, Underground and Trams - 10 projects |
| **Canada** | The strategy is being promoted in the main through the Canadian Council for Public-Private Partnerships. Below is a list of variety of projects procured through the PPP by 2001;<br>Airports and Civil Navigation - 4 projects<br>Education - 7 projects; Environmental - 24 project<br>Healthcare - 4 projects; Human Resources - 2<br>Inventory Management - 1 project; Property Management - 7 projects<br>Justice/ Correction - 2; Research - 3 projects<br>Ports and Seaways - 3; Information Technology - 15 projects<br>Land Development and Revitalisation - 4 project<br>Transportation (roads, bridges parking, etc) - 15 projects |
| **Australia** | - PPP policies and frameworks put in place by the states<br>- Some 24-36 defence projects earmarked by the Federal Government to be procured through the PPP route |
| **South Africa** | - By March 1998, 18 Municipal Services Partnerships projects in total value of R5.19 billion completed in partnership with the private sector and The Municipal Infrastructure Investment Unit (MIIU). The MIIU was launched in 1998 in response to the national government's realisation that the backlog of municipal infrastructure could be cleared by the combination of government intervention and private sector involvement<br>- Other projects include the N4 Pretoria - Maputu, N4 West - JHB - Botswana road projects |
| **Western Europe** | **Italy** - Framework in place. ( the Merloni Bills of 1994 and 1998)<br>**Spain** - a number of road projects operational eg the M45.<br>- 8 toll motorways due for completion by 2007<br>- 3 new rail lines on the drawing board<br>- the A6 Madrid-Galica Motorway project<br>**Portugal** - Widely seen as at the forefront of PPP with large road projects<br>**Greece** - a couple of projects such as the Spata Airport and Athen Ring Road<br>- PPP programme formally launched in November 2000<br>**Germany** - a BOT law passed with a number of road projects underway<br>**Finland** - PPP taskforce and pilot scheme put forward<br>- legal changes made to enable PPP take place |
| **Japan** | Projects underway and/or at the planning stages include:<br>- experimental facility for testing telecommunication systems at a research park in Yokosuka<br>- 11 housing complexes to house government employees |
| **The United Nations** | The UN Economic Commission for Europe (UNECE) has set up the following units aimed at promoting the concept:<br>- BOT Expert Group which includes representatives from many of the world's leading PPP enterprises<br>- UNECE Private Partnerships Alliance of governments and enterprises to develop pilot PPP projects, improve procedures and regulations and laws for the PPPs. |
| **The World Bank** | Some of the units set up to promote private sector participation include:<br>- Private Sector Advisory Services<br>- The Rapid Response Unit<br>- The International Finance Corporation. |

**Sources:** Bank of Scotland, (2002); The PFI Report, (2001); Shur, (2001); Hamilton, (2001); CCPPP, (2001); Brook, (2001).

The main drivers behind this fundamental shift in the way public and social infrastructure is being procured have been identified as budget deficits, ageing or poor infrastructure, and growing demand or expectations on public sector services. Others include the search for greater efficiency and creativity in the delivery of public services, the desire to introduce competition and the shortage of domestic experience (D&P Report, 2001; Rabin, 1992; Modic, 1989). The concept is therefore a rapidly growing means of procuring infrastructure assets and their associated services, signaling a fundamental shift in the relationships between the state and industry.

### 2.4.5 The PPP as an growth oriented strategy

Factors such as economies of scale and institutional reforms placing greater emphasis on private participation have been identified as determinants of development growth (Chen & Feng 2000). The service industry has also been recognized as making increasingly greater impact on growth in the developed economies (Griffin, 1999). The following therefore represent some of the anticipated and/or reported gains through the introduction of the PPP concepts.

#### *2.4.5.1 Efficiency in resource utilization*

The efficient allocation of resources has been recognized in the economics literature as a primary factor within the concept of economic development (Romer, 1990). It is argued that the concept of the public private partnership is first and foremost a method of procurement which seeks to achieve best value for money by focusing on the genuine transfer of risks to the private sector, the aim of which is to incentivize the private sector to manage and minimize those risks which are within their control (Private Finance Panel, 1996c). By putting emphasis on placing a contract for providing services rather than any particular asset, procurement through the PPP/PFI route is therefore thought to have in-built efficiency gains that outweigh the higher financing cost associated with private sector borrowing. As an example, the PFI solutions to the Wycombe and the Amersham hospitals were found to be actually more radical than the ones that were originally proposed by the public sector. There was a more radical solution to the layout of the site and the quality of the buildings with the result that the total scheme was both

lower in cost and preferred by the clinicians because they regarded it as of a better value (House of Commons 1996).

Payments under the projects procured through the PPP approach are done through a unitary payment system. With funding costs built into the unitary payment as a project cost, healthy competition amongst funders to reduce funding cost would thus be an advantage to the public sector procurer. Additionally, lenders to the private sector tend to be very much directly concerned with the quality of the projects they are funding. Before deciding to lend towards the cost of project, financial institutions apply very rigorous analysis and assessment of the risks of making the investment and thereafter, maintain close scrutiny over the project by imposing strict controls on the performance of other members of the consortium. This may not usually be the case when they lend to governments as they are sort of guaranteed the repayment, except such big time donors as the World Bank. In the same vein, improvement of service is associated with investment of risk capital. The providers of risk capital risks losing their money if things go wrong but equally should be able to generate increasing returns as the improvement in the services are achieved. As noted by the Scottish Office (1996), the presence of equity in the financial structure of PPP/PFI projects should be one of the key factors that should drive efficiency.

It has for instance, been noted that designers for projects procured directly by the public have had the long standing complaint of not being allowed to design to the required standards because of budgetary constraints, with the result that a few years down the line the structures begin to deteriorate at a rather fast rate (House of Commons, 1996). However, by transferring to the private sector the responsibility of designing, constructing, financing and operating the scheme, the private sector would consider the obligations as a whole over the specified life of the contract, taking full account of the risks inherent at each stage, including the long term maintenance costs. There is also the contractual requirement, of course, that the facility will be of economic use for much longer period than the concession period and would be handed over where applicable with a specified life expectancy.

A direct relationship therefore exists between the way a scheme is designed and constructed and its whole life operational cost. With the private sector choosing how to provide the service to the level specified by the public sector client and appropriate risks allocated to the party best able to manage them, this should lead to an efficient service and a lower whole–life cost. In a case study on eight DBFO road contracts, cost savings compared with the public sector comparator averaged 15%. For road projects, because the operators would be paid each year primarily according to the level of usage of the road, their income will vary as traffic varies. Making them take a share of the traffic risks in this way, it is hoped, would help establish a private sector road operating industry which will be sensitive to road usage and open up the avenue for more efficient construction and maintenance practices (Highway Agency, 1997).

Competition has been identified as a key factor in the efficient allocation of resources. Not only are tenders for PPP/PFI projects procured competitively but it has for instance been reported that on the first four DBFO projects procured by the Highways Agency another dimension to the value for money exercise was introduced by asking the other short-listed bidders to keep their bids on the table as reserved bidders while negotiations continued with the preferred bidders, thus effectively sustaining the competitive pressure. In two of the projects, A1(M) and the A419/A417, the successful consortium, Road Management Group, was made to absorb most of the increases in their revised bid as a result of this competitive pressure which would otherwise have increased the present value of their bids (NAO, 1997a).

One objective of the PPP is to minimize claims by transferring responsibility to the private sector in order to achieve value for money. In the traditional form of procurement for example, claims could be made for unforeseen design errors, etc. A study conducted by the National Audit Office on a sample of 42 traditionally procured road projects each worth over £0.5 million, revealed an average increase of 28% between tender and out-turn price (NAO, 1997b). An important dispute prevention technique within the construction industry is the equitable distribution of risks. Another dispute prevention

technique is the use of positive contractual incentives to reach certain performance results which have an effective means of aligning the contractor's goal with the client. These can encourage superior performance and discourage claims oriented conduct. In a study into the top causes of contractual disputes in the USA, failure to deal promptly with changes and changed conditions and owner changes which disrupt the flow of the contractor's work, were identified as the highest ranking causes of disputes (Diekmann & Girard, 1995). The principles underlying the PPP procurement process attempt to effectively eliminate these problems as design responsibility rests with the private sector and the partnership approach is founded on win-win scenario.

### *2.4.5.2 Investment and structural transformation*

One of the key benefits advanced for the PPP strategy is that of fostering economic growth through innovative investments. Brinkman (1995), identified investment as the engine of growth, while others like Solow (1957), Schumpeter (1954) Kuznets (1965), and Romer (1990), identified technological change as lying at the heart of economic growth. Griffin (1999) also drew conclusions from his empirical studies that economic growth and expansion are impossible without investment. The UK government's objective has been focused towards reducing public spending to below 40 per cent of GDP. The injection of private capital investment and expertise through the PPP/ PFI is therefore a key factor in reconciling the need for sound public finances with acceptable levels of taxation and huge investment in infrastructure. As at March 2000, over 430 PPP/PFI projects with estimated capital value in the region of £32 billion have either been procured or at various stages of the procurement process nationwide covering all sectors of the economy from education, health through to defence. Figures 2.12 and 2.13 give a vivid picture of the PPP/PFI project landscape within the UK as at March 2000.

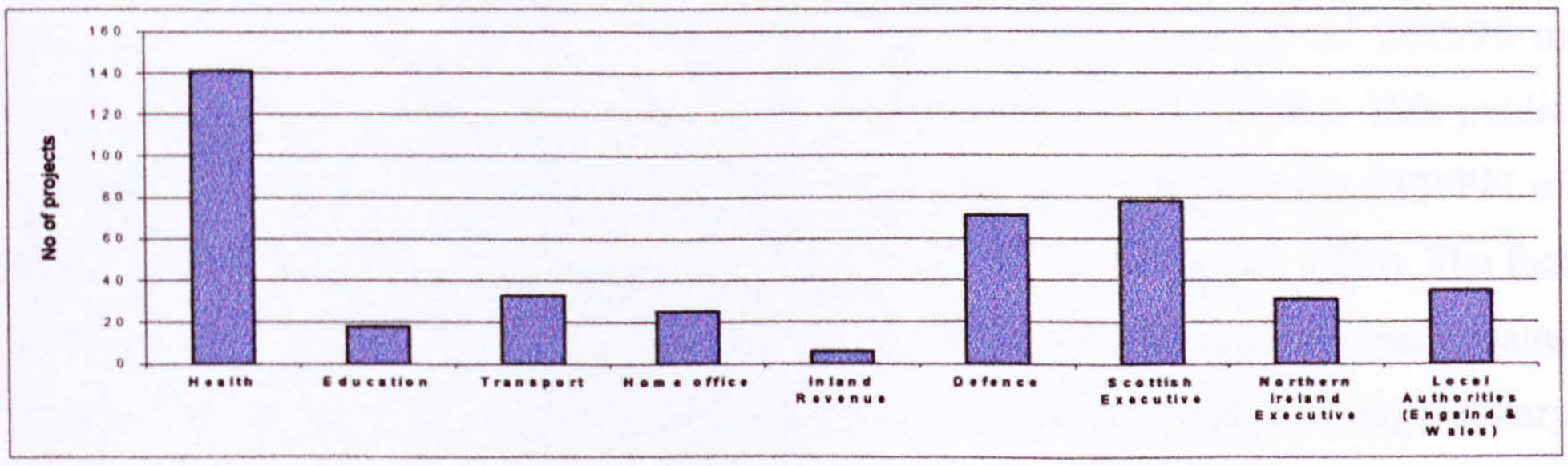



**Figure 2.12 Total number of PFI/PPP projects as at March 2000**
Data source: DETR (2000)

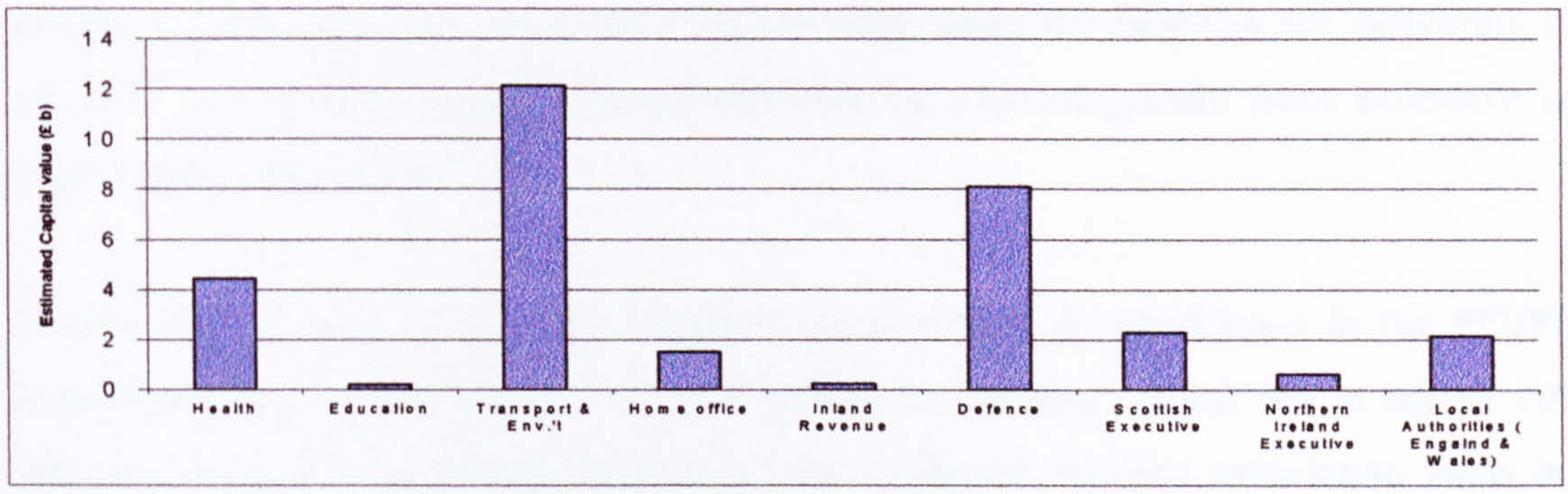



**Figure 2.13 Estimated Capital Value of PFI/PPP projects as at March 2000**
Data source: DETR (2000)

The transportation sector has seen the largest infusion of private capital in project size and value since the introduction of the PPP/PFI. As at March 2000 some £7.5b worth of private investment through PPP/PFI were concluded ranging in various sizes such as the Channel Tunnel Link worth £4b (DETR, 2000). Other projects include such major bridges as the 812 metre cable stay Dartford River Crossing over the Thames, the 5.2km long Second Severn Crossing, the Skye Bridge consisting of a 500m main bridge with 70m long approach viaduct and 200m secondary bridge. Other rail projects include the £200 million 4.2km underground Docklands Light Rail Link to Lewisham, of which the private sector company, City Greenwich Lewisham Rail Link plc, is contributing £165m (Treasury Taskforce 1997). A number of road project have also been undertaken and/or being undertaken via the PFI/PPP route such as the A74(M)/M74 in Scotland, the first eight DBFO road projects in England which, including six others announced, had a total capital value of £1.3bn (Highway Agency,1997).

These huge private sector injections of capital are thus expected to reduce the Public Borrowing Requirement (PBR). For example, over the planning period of 1995/96 to 1998/99, public sector capital expenditure was expected to fall by £2.5bn. This public capital expenditure shortfall was expected to be offset by investments under PPP/PFI of about £2.8 billion during the financial year 1998/99 (House of Commons, 1996). The fact that some of these projects are expected to pay for themselves through revenue streams generated by the facilities, and that those paid for by the state are paid through unitary

pricing systems over the concession periods only when the facilities are delivering the services, government budgets should therefore be relieved greatly from excessive up-front capital expenditures.

Within the financial sector, new products are emerging as confidence in the PFI/PPP continues to grow. Nubben & Mcintosh (1997) for instance, noted that in March 1997 NatWest Markets had converted almost £1bn of British housing association loans into bonds in a PFI securitisation exercise. A number of other PPP/PFI investment funds such as the Innisfree and BZW, are being set up with the likelihood of being floated on the stock market. This represents a healthy sign as the input of financiers could be courted earlier and thus minimizing the chronic delays in reaching early financial close. With concession periods set beyond the range of conventional debt, financial innovation should be encouraged through the use of alternative sources of funding. There is also the possibility of re-financing after the completion of construction, all of which can provide financial benefits to the project sponsor; a method used in the eight benchmarking PFI projects by the Highways Agency

Owen and Merna (1999) noted that with margins on projects procured through the conventional means running at 0-3%, PPP/PFI offered a good opportunity for contracting firms within the UK to diversify their work and realize greater margins. Currently, return on investments for some PPP/PFI projects average 15 to 20 percent annually (NAO, 1999a p 37). They however observed that a major failing with UK contractors was their inability to contribute equity into the finance package. However, with the influx of foreign investment in the form of large stock acquisitions of major UK construction companies (e.g. Malaysia's Intria Berhad into Costain and Kvaerner into Trafalgar House and Bouygues into Tarmac), the equity capital base of these firms should improve substantially.

The professional consulting industry is equally experiencing some structural changes. With bidding consortium being led by large construction firms, the fear as was associated with design and build, was that the larger construction firms would use their economic

might to muscle them out as they already have in-house design capabilities. This fear however has largely proved unfounded since the consortia are invariably depending extensively on the services of consultants and advisers, with some participating as equity partners. They are also actively participating in the process as advisers to the public sector procurers in the financial, legal and technical disciplines.

In 1996, the then Chancellor, Lamont, in a speech to the Private Finance Annual Conference, observed that interest in the PFI was growing nation-wide and that this interest was not confined to the UK alone as overseas delegates kept coming over to also learn about it. He further noted that like privatization before it, PFI was fast becoming another successful British export (HM Treasury, 1996). It was reported in the 4th June, 1999 edition of the Building magazine that Japan was planning to pass its PFI bill in the summer of 1999 which was earmarked to bring in Y1000bn (£5bn) worth of investment – a possible opportunities for British firms specializing in the PPP/PFI procurement process (Cavill, 1999). ). A number of investigations, such as those of Balassa (1985), Fosu (1992), as cited in Aiello (1999), also demonstrated that positive correlation exist between the growth of exports and economic growth.

### *2.4.5.3 Knowledge formulation and diffusion*

The development, dissemination and advancement of useful knowledge, in particular scientific knowledge, has been identified by Kuznets (1966), as a crucial contributing factor to economic growth. As cited in Ruttan, (1998), this view was also shared by Romer (1986) who argued that long-run growth is driven primarily by the accumulation of knowledge by forward-looking profit maximizing agents and that the creation of new knowledge generates positive external effect on the production of technology. Hence the contribution of ideas is the primary source of economic growth. Finding better ways of doing things has always been the main source of long-term economic growth since economies are increasingly being based on knowledge.

As indicated in Figure 2.14 the interaction of mankind with the environment encompassing culture and the physical world originates new knowledge and knowledge

appears in its application as technology and in its store as culture. Brinkman, (1995) describes this as the dichotomy of useful knowledge.

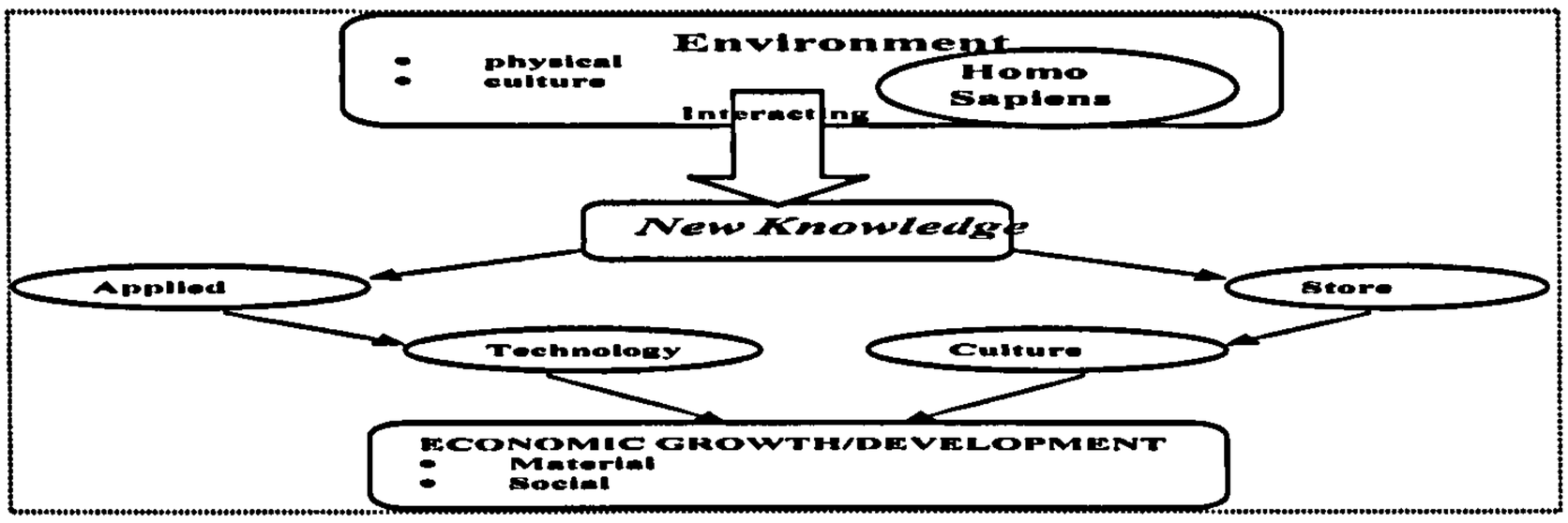



**Figure 2.14 The Dichotomy of Useful Knowledge**
Source: Adapted from Brinkman (1995)

For very complex PPP/PFI projects, transaction teams consisting of members of the public sector agency, legal, technical and financial advisers from consulting groups are constituted after receiving intensive training in team building and negotiating skills in helping to evaluate the bids and subsequently negotiate with the bidders. This process should substantially help to achieve better value for money by awarding the projects to only bidders with financially and technically robust offers and not necessarily the cheapest. The same team building effort takes place within the consortiums, in very intense fashion. This should therefore help the development and diffusion of both tacit and explicit knowledge.

The most important resources have been recognized as knowledge based and that for new joint capability to be developed from existing capabilities which are most likely to be underpinned by tacit knowledge, then these tacit knowledge bases could be best shared through the process of frequent physical proximity, shared experience and the development of trust – i.e. partnership relationships (Hall, 2000). One noteworthy benefit of the PFI competition organized by the Prison Service for the Bridgend and Fazakerley prisons was the opportunity of accessing overseas expertise in prison construction and operation. Three of the five bidders had overseas partners in the consortium i.e. American and French. The winning consortium, Securicor/Costain added Skanska, a Swedish

construction partner, also carried out research into American prison design and operations which contributed to the innovative aspects of their proposals (NAO, 1997b).

Under the DBFO road projects undertaken by the Highway Agency, the agency noted that some bidders also applied value-engineering techniques throughout the procurement process to reduce construction cost by optimizing the Agency's design. The National Audit Office is noted as observing that a notable feature of the A74(M)/M74 DBFO project in Scotland was the liaison of the Scottish Office project staff with their English counterparts, the Highway Agency, for the cross-fertilization of ideas and the taping of the rich knowledge gained from the latter's experience on their first four pathfinder DBFO road projects. Similar expertise gained by the NHS on their Dartford and Gravesham PFI hospital project is being diffused onto their other numerous PPP/PFI projects (NAO, 1999b).

As stated in the UK Government's Convergence document (HM Treasury, 1998), the primary responsibility of fiscal policy in its long-term macroeconomic framework is to contribute to economic stability through sound public finances by drawing a clear distinction between current and capital spending, and to ensure that current spending is paid for as it occurs and not a burden on future generations. The public private partnership form of procurement by which unitary pricing systems of payments are effected over the life of the project therefore seeks to answer this aspect of the economic policy.

Net investment was forecast to increase from its present level of 0.5% of GDP to 1.1% by 2001-02, as part of the measures designed to address the maintenance backlog within the public sector and improve on the existing infrastructure partnerships (HM Treasury, 1998). Much of this investment was expected to come from the private sector by way of public private. The setting up of **Partnership UK** following the Bate's second review of the Private Finance initiative in which a total £1 billion in equity and debt was to be raised to promote projects through the PPP/PFI approach (Building, 1999). As cited in Chen and Feng (2000), the works of Kormendi and Merguire (1985), and Levine and

Renelt (1992), have demonstrated that investment as a share of GDP has a significant and positive effect on economic growth.

Knowledge generated as a result of the introduction of the initiative is increasingly having a spillover effect. The Financial Times of London for instance reported that Mr Montague, former head of the projects arm of the PFI taskforce had been hired to play a key role in the privatization of the London Underground. He is also reported to be advising the Dutch Ministry of Finance on the development of that country's PPP (FT, 2001a). In effect knowledge and expertise in this form of procurement strategy is not only being disseminated locally but is also becoming an export commodity, a requirement essential for economic growth. The initiative is therefore becoming an investment which is creating and revealing further opportunities, a necessary criterion for growth.

Hopefully, the envisaged development of an equity market within the infrastructure industry should pave the way for the inflow of direct foreign investment into the UK economy; a condition recognized by development economists as essential for growth. It has for instance been noted that Japan for example has many rich people with huge amounts of money but very few safe places to invest in (FT 2001b). In theory, such surplus savings could flow into the UK infrastructure industry once an investment market is clearly established.

Based on the principle that the PPP/PFI is expected to deliver value for money, that the level of service to be delivered to the customers will be better than if delivered by the public sector, and that in the long term this should influence the public sector to become more competitive in the management of public assets, the general effect on the macroeconomic climate of the nation should therefore be a positive one. Experience especially in the USA, has also shown that public-private partnerships have proved to be productive especially in the health sector and that efficiency gains have been realized in many public sector organizations (Rabin, 1992; Modic, 1989). In the same vein, there have been some disappointing results elsewhere especially in the developing countries for

example the cancellation of power project agreements in Pakistan, renegotiations of power and water agreements in India and Argentina respectively, and dispute over toll roads in Bangkok (Wells, 1999; Tam, 1999).

One must however not lose sight of the fact that projects procured under PPP are long term in nature and therefore have the tendency to experience what is termed the *'obsolescing bargain model'* where the initial project drivers change with time (Wells, 1999). In order to keep the innovative motif alive, the packaging of these projects/contracts should be such that slices within them can be revisited periodically for review to keep pace with the ever changing technological advancement necessary for economic growth. As a means of testing whether the objectives are actually being achieved on the ground, a number of projects that have successfully taken off need to be studied in detail against the initial base line situations.

There is also the concern however that by turning capital into current expenditure, the cost of investments is passed to the future. This could have implications on the government's revenue expenditure in the light of PFI/PPP commitments being entered into by diverse organizations - a situation that might render control and monitoring difficult. A further observation was that in some instances such as the health projects, the PPP/PFI approach had delayed investment rather than encouraged it due to the rather long delays encountered during the procurement processes. An additional concern is that since the private sector is motivated essentially by profits, priorities might get distorted with profit making projects taking priority position over projects that might deliver social benefits generally.

### 2.4.6 Difficulties associated with the PPP process

Despites its global appeal and the anticipated benefits of the PPP concept, delays and spiraling bidding costs during the pre-contract stages have frequently been cited as major impediments in the implementation of this philosophy. This resulted in the expression of

dissatisfaction by the private sector participants in particular and in some cases the general public (The Herald, 2002; NAO, 1999a; Owen and Merna, 1999).

The very diverse nature of the infrastructure procurement industry naturally makes the management of any new and innovative mode of procurement strategy, such as the PPP, much more difficult. The introduction of this new and innovative way of procuring infrastructure services means a change in the way the industry's services are rendered and/or purchased by the respective stakeholders. In some situations, it would require either partial and/or complete restructuring of the relationships between stakeholders. Change introduces risk and uncertainties; it is therefore not surprising that such delays, frustrations and the pre-contract cost overruns have been reported in the implementation of the PPP strategy for the procurement of infrastructure services. However this should not remain an endemic feature of the system. Hence the main objective of this study is investigate and develop a model that clearly identifies the key attributes that make the process work more efficiently and effectively.

Although a number of successes have been reported on projects procured through the Public-Private Partnerships/Private Finance arrangements, there have been substantial teething problems associated with the process. This is particularly true of the initial stages of the process (The Herald, 2002; Yeo & Tiong, 2000; Tam, 1999; Owen & Merna, 1999). Some of these relate to excessive delays during the bidding and negotiation stages and the associated high bidding and advisory costs, some of which run as high as 600% above their original estimates (Ahadzi & Bowles 2001b).

The focus of this research however is on the risks encountered during the bidding or the pre-contact phase of the procurement process – the risks of pre-contract time and bidding cost overruns due mainly to the protracted negotiations. With the initial outlay in both human and capital investment during the bidding period already generally high for both the private sector consortium and the public sector client, any delays in the process will not only exacerbate the situation but will mean missed opportunities for the needed investment in the development and renewal of public infrastructure including missed

opportunities for economic and social advancement. Mott Macdonald (2002) in their published document – *Review of Large Public Procurement in the UK* - came up with the finding that due to the rather prolonged nature of the pre-contract stages of the PPP/PFI procurement process, their overall project completion times are longer as compared to other modes of procurement strategy such as the traditional form. Earlier research, (Ahadzi and Bowles, 2001b), identified the contract negotiation as the critical stage during which delays are most prominent.

Wang, *et al* (2000), Ozdoganm & Birgonul (2000), Tam (1999), Treasury Taskforce (1997), Songer, *et al* (1997), UNIDO (1995), Drake (1994), Yates and Mukherjee (1993), have variously identified the key risk areas associated with privately financed infrastructure projects. These risk areas can be broadly categorised as Bidding, Construction and Operating Risks. Risks in privately financed infrastructure projects are heightened by the rather large capital outlays, the long lead-time and the fact that financiers will have to exclusively rely on the project cash flows for their returns. The genuine and prudent transfer and/or allocation of risks is therefore a critical factor in determining whether the private sector will respond positively to participate in a PPP/PFI bidding process including the realisation of main objective of value for money. When tenders for the first two PFI custodial services, i.e. Bridgend and Fazakerley prisons were received, none of the parties invited to tender felt able to comply with the Prison Services' terms and conditions relating to the nature of risks they were being asked to bear. The invitation to tender resulted in non-complaint bids, which was quite an expensive procedure (NAO, 1997b).

A commonly stated problem with PPP procurement is the rather long time it takes to conclude a deal due to protracted negotiations, and the high cost associated with the process. Owen & Merna, (1999) have identified these problems as being the reason behind several high profile withdrawals during the early PPP/PFI tenders, resulting in some preferred bidders being selected by defaults as other competitors withdrew. Bidding for a PPP/PFI project is usually much more complex than for a traditional public sector project involving the appointment of top advisers and designers at a great fee in the

preparation of detailed design, comprehensive planning, extensive bid documentation, and lengthy clarifications. Jarvis, for example, had experienced dissatisfaction with some of its biggest schools PFI projects due to delays in the bidding process and increasing bidding costs, a situation which is reducing their profits by as much £12m in their current financial year. Similar sentiments were expressed by the Finance Director of Carillion, one of the key players in the PPP projects, that bidding costs for PPP projects cost them £6m in the first half of 2003 and were expected to rise to £12m by the end of the year (Contract Journal, 2003). These developments have prompted suggestions from bidders that the public sector procurer compensates the bidders for some of the excessive bidding costs especially the second lowest bidder who is made to keep his bid on hold as a means of maintaining competitive pressure on the lowest bidder.

There is also the added perception that public sector managers have been 'cocooned' in a culture of 'rules not deals' (Gallimore *et al*, 1996). Hence, it could be said that the public and private sector decision makers are dissimilarly conditioned in their attitude to risks and thus limiting sufficiency in the convergence of opinions on the level and degree of risk as to enable agreement on price to take place.

Figure 2.15 gives an indication of the average cost of bidding for four DBFO (PFI) road projects at the various stages of the procurement process. Figure 2.16 also gives a comparative picture of the proportion of bidding costs to total project costs using the different procurement strategies.

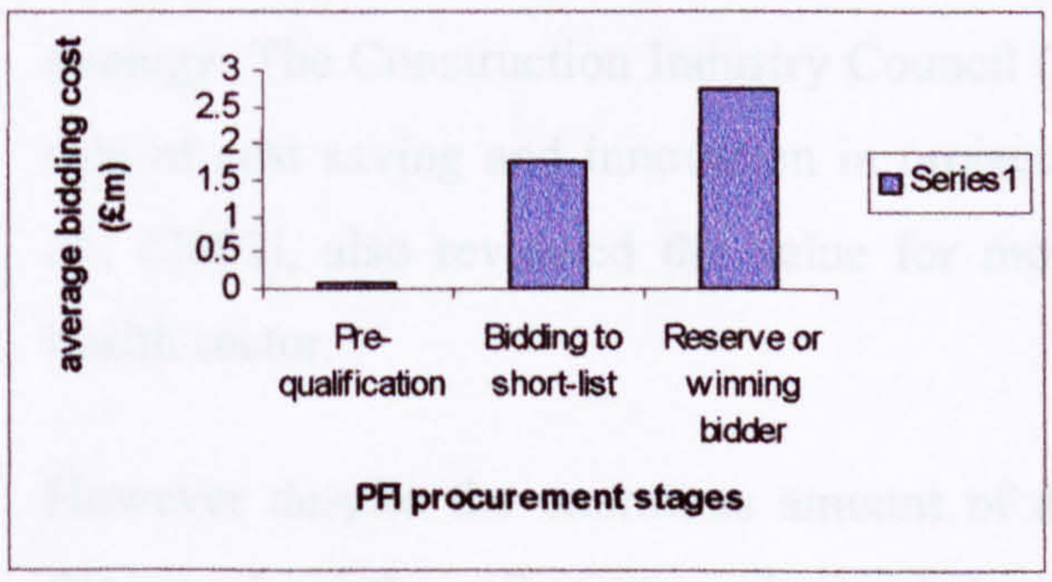



**Figure 2.15 Average bidding cost of PFI road projects**
Data source: NAO, (1997a)

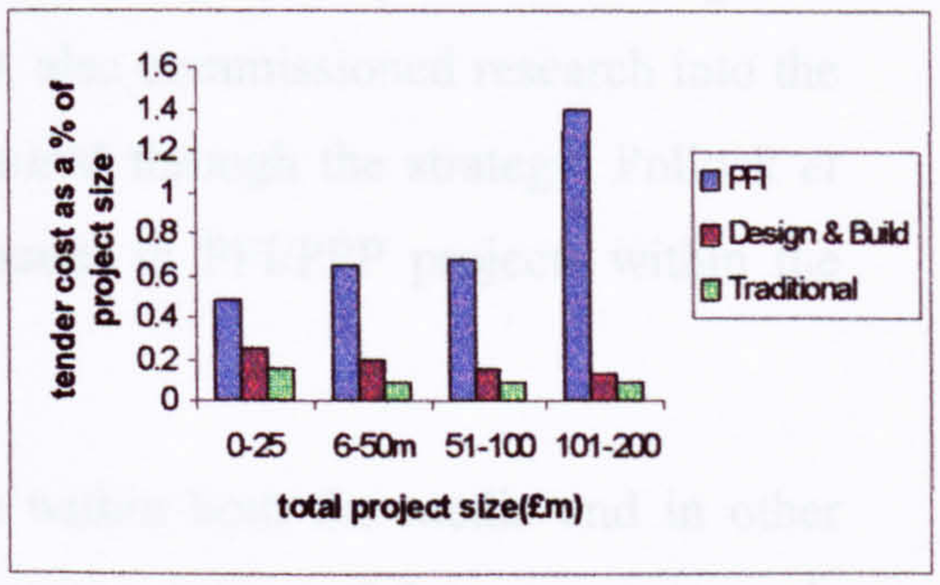



**Figure 2.16Tender costs as a % of total project cost**
Source: HC treasury subcommittee 6th Report

The costs to the public sector departments in terms of consultancy and advisory fees have equally been quite high as exemplified in Table 2.3. Due to the uncertain scope of the works involved in letting the early PFI contracts, both the public sector agencies and the advisers found it difficult to set accurate budgets for advisers' costs. On some projects the principal advisers' costs were over 600% their initial estimates (NAO, 1999a p 49)

**Table 2.3 Advisory costs on some early PFI projects**

| Project | Capital Value (£m) | Advisory costs (£m excluding VAT) |
|---|---|---|
| Dartford & Gravesham hospitals | 94 | 2.36 |
| Carlisle NHS Trust Hospital | 65 | 1.43 |
| South Buckinghamshire Hospital | 45 | 2.6 |
| Norfolk and Norwich hospitals | 144 | 4.43 |
| North Durham hospital | 61 | 1.83 |
| Bridgend & Fazakerley Prisons | 162 | 1.5 |

Source: NAO, 1999a p50

The risk of procurement time and cost overruns has been a feature of most of the PPP/PFI projects. In the case of the A74(M)/M74 DBFO road project in Scotland for instance, as a result of the extensive consultations with the bidders, the procurement time scale had to be revised from 17 months to 27 months. The result of this revised time-scale and other unforeseen events was that the procurement costs to the public sector procurer increased from £1.3m to £2.85m (NAO, 1999b).

### 2.4.7 Level of research interest in the PPP Concept

The concept of the PPP/PFI since its introduction in the UK in 1992 has generated some fair amount of research interest. Akintoye *et al.*, (2002); Bing Li *et al.*, (2002) for example examined risk assessment and management within projects procured through the strategy. The Construction Industry Council (2000), also commissioned research into the role of cost saving and innovation in projects procured through the strategy. Pollock *et al.*, (2002), also reviewed the value for money issues in PFI/PPP projects within the health sector.

However despite the enormous amount of debate within both the media and in other forums about the rather expensive and time consuming nature of the process towards reaching agreement, there has not been an all embracing research encompassing the

entire spectrum of attributes that impact on the successful implementation of the process during the pre-contract stages. This study therefore aims at developing a Generic Multi-Attribute Hierarchical Model, the essence of which is to add to the understanding of the importance of proactively identifying and managing these attributes during the complex contract negotiations in order to achieve win-win scenarios and value for money within these long term relational procurement strategy. The model should therefore act a practical framework for negotiators involved in the PPP/PFI procurement process so as to prepare themselves better for the complex negotiations. It should also help others in the business of contract negotiations to recognize the need for a broader perspective in their approach to the negotiation process. The study is based on the UK, a country in the forefront of not only adopting the strategy but also vigorously refining and promoting it internationally (D&P Report, 2001; Stone, 2001).

# PART B: The Theory on Contract Negotiations and Bargaining

## 2.5 Definition and Context

According to McCall and Warrington (1989), negotiation is increasingly being viewed as a relatively universal phenomenon. They define it as follows:

*Negotiation is any sequence of written and/or verbal communication process whereby parties to both common and conflicting commercial interests and of differing cultural backgrounds consider the form of any joint action they might take in pursuit of their individual objectives which will define or redefine the terms of their interdependence .*

The process is thus a result of the need for resolution of conflict. It is a dynamic process of adjusting by which two parties, each with their own objectives, confer together to reach a mutually satisfying agreement on a matter of common interest. This should lead both parties to emphasize the cooperative nature of their relationship and to convert as far as possible the issues dividing them into problems to be solved in order to increase their total benefits or joint utility (Marsh, 2001; Kennedy *et al.*, 1987).

In the realm of contract negotiations, the procurer's and the contractor's terms and conditions, the financial, technical and commercial differences, which in turn are linked to their respective organization's objectives, will be the focus of issues on which they seek agreement. Each party would have differing views represented at the negotiation table on these issues for which each side would be striving to gain an advantage, with the result that where the negotiating atmosphere is distributive rather than integrative where reciprocity is key to resolving issues, the process could be prolonged unnecessarily.

McCall and Warrington (1989) citing the works of Galbraith (1975), indicated that as a result of the increasing development and technical complexity of products and the processes by which they are manufactured, the web of contracts to secure the price and supply of the products and services, continue to expand. As a result, millions of contracts are in existence at any time with tens of thousands negotiated each week. Contract

negotiation in the planning system is therefore a major preoccupation. A businessman at anytime is thus negotiating a contract, assembling information that allows him to do so, contemplating the renewal of a contract or considering the cancellation of a contract.

Within the world of commerce, contracts that are a subject of negotiation in respect of specification, price and payment conditions, delivery, performance and other terms of concern to the parties. The negotiations are frequently opened by the prospective client often after discussions with the prospective supplier/contractor, by first asking the supplier/contractor to quote against the former's requirements. This is often the case with engineering products of the capital goods variety or with products of high elements of technology where the client/buyer relies on the judgment of the supplier/contractor to meet his/her requirements. The resultant quotation is normally an offer subject to the seller's conditions of sale, and is open for acceptance unless it is qualified to show that the proposal is a negotiating step only. The PPP/PFI procurement is basically structured in a similar fashion where the public sector organization, seeking to procure services from the private sector, solicits an offer through invitation to negotiate and provides his requirements by way of output specifications. The resulting response from the private sector becomes an offer subject to negotiations.

The process of bargaining can again be defined as an interaction that occurs when two or more persons attempt to agree on a mutually acceptable outcome in a situation where their orders of preference for possible outcomes are negatively correlated. In situations of this nature, a number of proposed settlements of the mixed-motive conflict can be offered so that both sides can have the opportunity of improving their outcomes provided agreement can be reached. The process towards reaching agreement therefore involves interpersonal bargaining which is a common method of resolving conflicts. Hence the most prevalent concern in bargaining research has been to identify the factors that determine whether an agreement can be reached, and the amount of time required to reach an agreement. Others include the nature of the agreement and the degree of satisfaction with the agreement, and the commitment to carry it out (Hammer & Yukl,

1977)

### 2.5.1 Bargaining types during negotiations

Writers on negotiation and bargaining have identified two types of bargaining during any form of negotiations (Raifa H, 1982; Ury W, 1992; McCall and Warrington, 1989). These are the *distributive* and *integrative* types of bargaining. Contract negotiations for major infrastructure projects tend to be the distributive type as both sides generally try to settle mainly over price. This is particularly true with the traditional form of procurement. In construction contract negotiations in particular, every conflict on issues has implications for costs and outcomes. The more issues there are, the greater the opportunity there will be to explore how resources and in particular risks will be exchanged or shared.

#### *2.5.1.1 Distributive bargaining*

Within this type of bargaining, the parties are concerned with establishing the negotiating range by taking up their extreme positions in relation to the issues about which they are in conflict. These extreme positions reflect the most hopeful objectives of the parties, as distinct from those they would like to settle at, and represent the starting point for the assessment of the feasibility of demands. Some of these objectives will not be known prior to the negotiation and will have to be established during the negotiation process. Most negotiators will seek to convince their opponent that their opening position is their limit. The reality is that a negotiator's behaviour is rarely accommodating to the extent that he will move all the way towards his opponent's position. It is more likely that the implications of the positions taken up will be assessed.

According to McCall and Warrington (1989), research into the effects of early cooperative or competitive attitudes on the course of negotiation led to the conclusion that the early initiation of cooperative behaviour tends to promote the development of trust and a mutually beneficial cooperative relationship, and that early competitive behaviour tends to induce mutual suspicion and competition.

Distributive bargaining tends to be generally exhibited at the early stages of the negotiation process. Negotiators often consider it appropriate for this stage of negotiation to be used to test limits and a variety of behaviours with their opponents before committing themselves to a particular stance. It has been established that a hostile act in the early stages of a relationship is far less likely to induce a retaliatory response than one performed at the later stages. However it is vital that trust is quickly established at this stage. Once established, mutual trust allows negotiators to adopt a cooperative pattern of behaviour that may prevail throughout the negotiations. Maxwell *et al* (2003) for example have established that extreme position taking at any negotiation has a spiraling effect where each side tries to adopt a tit-for-tat attitude.

Bargaining is generally done within the perspective of conflict resolving behaviour. This has for example been developed into two dimensions of behaviour, i.e. assertive/unassertive and uncooperative/cooperative. The assertive/unassertive behaviour tend to measure the extent to which a party seeks to satisfy his own objectives and the uncooperative/cooperative measure the extent to which s/he attempts to satisfy other's objective. This sort of dimensions of behaviour in conflict resolution is demonstrated in Figure 2.17

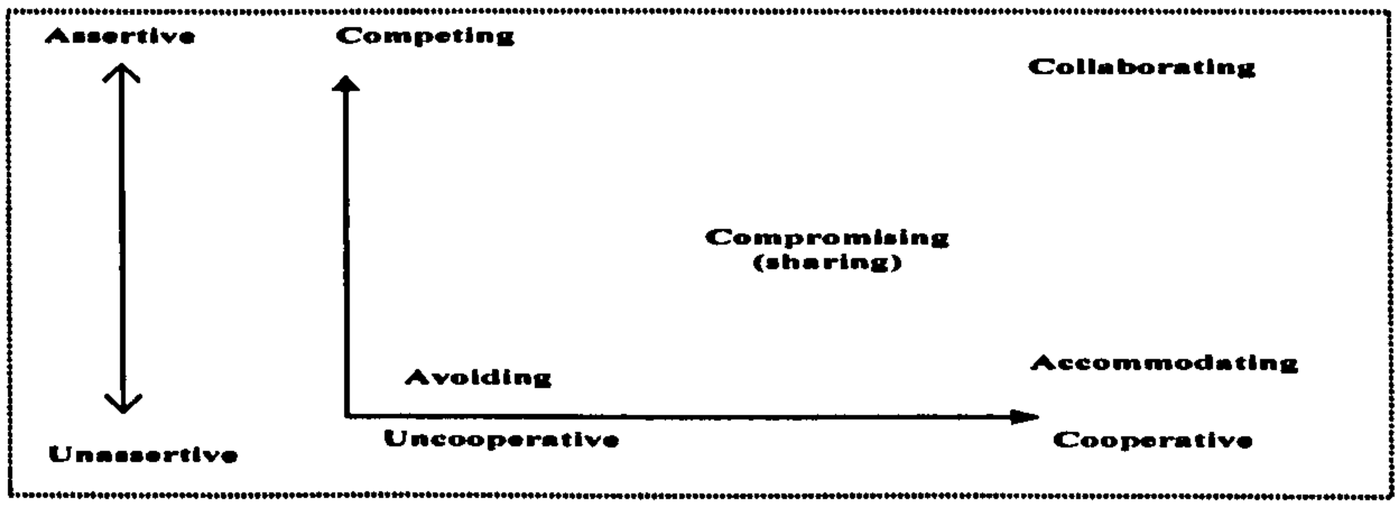



**Figure 2.17 Conflict-handling behaviour open to negotiators**
Source: McCall and Warrington (1989)

According to McCall and Warrington (1989) avoiding and accommodating behaviours are not normally expected in negotiations. To them, if they do occur, behaviour of the avoiding type will result in breakdown and behaviour of the accommodating type would result in agreements being made immediately by acceptance of the accommodating behaviour. Competing is a behavioural state whose outcome is based on power (Kennedy

*et al*, 1987). A competing approach has to be matched by a complete accommodation by the other side, otherwise agreement is unlikely. Collaborating behaviour is based on the premise that a joint problem solving operative provides for the most mutual advantageous outcome. Such an approach is seen to have the ability to create alternatives which increase the total benefits from which both parties share more than they would from a compromise outcome. Compromising is a strategy which is directed at resolving conflict by give and take on both sides.

### *2.5.1.2 Integrative Bargaining*

This mode of bargaining is characterized by movements toward reaching an agreement based on problem solving through synergy. To be able to adopt this mode of bargaining it is important to overcome what is termed the concession dilemma where either as a result of the fear of losing face and the danger of antagonizing an opponent through appearing to be more and more committed to an earlier position, the parties tend to stay poles apart. One approach to avoid such a situation according to Morley and Stephenson (1977), is to adopt the principle of conveying without commitment by way of indicating behaviour. This is done by each negotiator asking questions where s/he gives his opponent the chance to develop aspects of his/her objectives.

Any negotiator who chooses to be uncooperative induces uncooperative behaviour in the opponent as well. Where a negotiator is cooperative, the need for the opponent to maintain face is reduced and cooperation is generally reciprocated. Under such circumstances there is a synergistic joint effort aimed at not only distributing the pie in a mutually advantageous manner but rather increasing the size of the pie that needs to be shared. This is achieved by keeping issues linked as reflected in package deals or tie-ins. The package deal involves proposals to settle generally related issues simultaneously while tie-ins involve the introduction of issues that may be extraneous to a given set, with the stipulation that the settlement of the set is dependent on the satisfactory agreement on the extraneous issues as well. The trade-off resulting from such concessions are more efficient because they lead to significantly high joint outcome distribution. The greater the number of issues, the greater the pressure to differentiate between them, and to

separate them into different packages according to their importance or into some form of grouping.

In a nutshell, distributive bargaining tends to deal with issues as the subject matter while integrative bargaining focuses on problem solving. According to Walton & McKersie (1965), issues involve a fixed total objective value, which in its pure form would require that whatever gain is available to one party necessarily entails a corresponding and equal sacrifice by the other party. On the other hand, problems are agenda items which contain possibilities for greater or lesser amounts of value which can be made available to the parties, the outcomes of which the two parties would be equally concerned. Pruit & Lewis (1977) identified integrative bargaining as a creative process in which new options are discovered during the negotiations process, representing a set of all possible solutions to the bargaining problem at hand. The distributive bargaining model is therefore equated to the win-lose mindset during the negotiations while the integrative type equates to win-win approach.

### 2.5.2 The bargaining framework/continuum

The initial positions parties adopt during negotiations do take into consideration expectations of a pattern of responsive concessions occurring over the bargaining period. The bargaining outcome therefore rests between the initial offer of the contractor and what the client specifies as the top limit of what s/he will pay. For every offer where there is an element of possible negotiations, the bidder will build into the offer concessions or contingency features in excess of his/her target objective which may be his/her minimum below which s/he will not be prepared to go. The area between what the contractor has offered and what the client is prepared to pay for is what is termed in negotiations as the *bargaining arena* (Kennedy *et al*, 1987). This is illustrated in Figure 2.18 overleaf. In situations where what the bidder wants is in excess of what the client is prepared to pay, no agreement will follow until both parties have altered the expectations of the other. Where the overlap between the bidder's and the client's limit is small as in (1), neither will see possible outcomes as a fair deal to him/herself unless each of them can alter the other's expectations, or by cooperation, enlarge the bargaining overlap. Where there is

sufficient bargaining room for each to go away satisfied that s/he has made an advantageous agreement, an agreement will be reached much more easily and quickly as depicted in (2). In situations where there is no overlap as in (3), it is unlikely for the parties to reach an agreement and the likelihood is a breakdown in the negotiations unless the parties' expectations can be considerably altered.

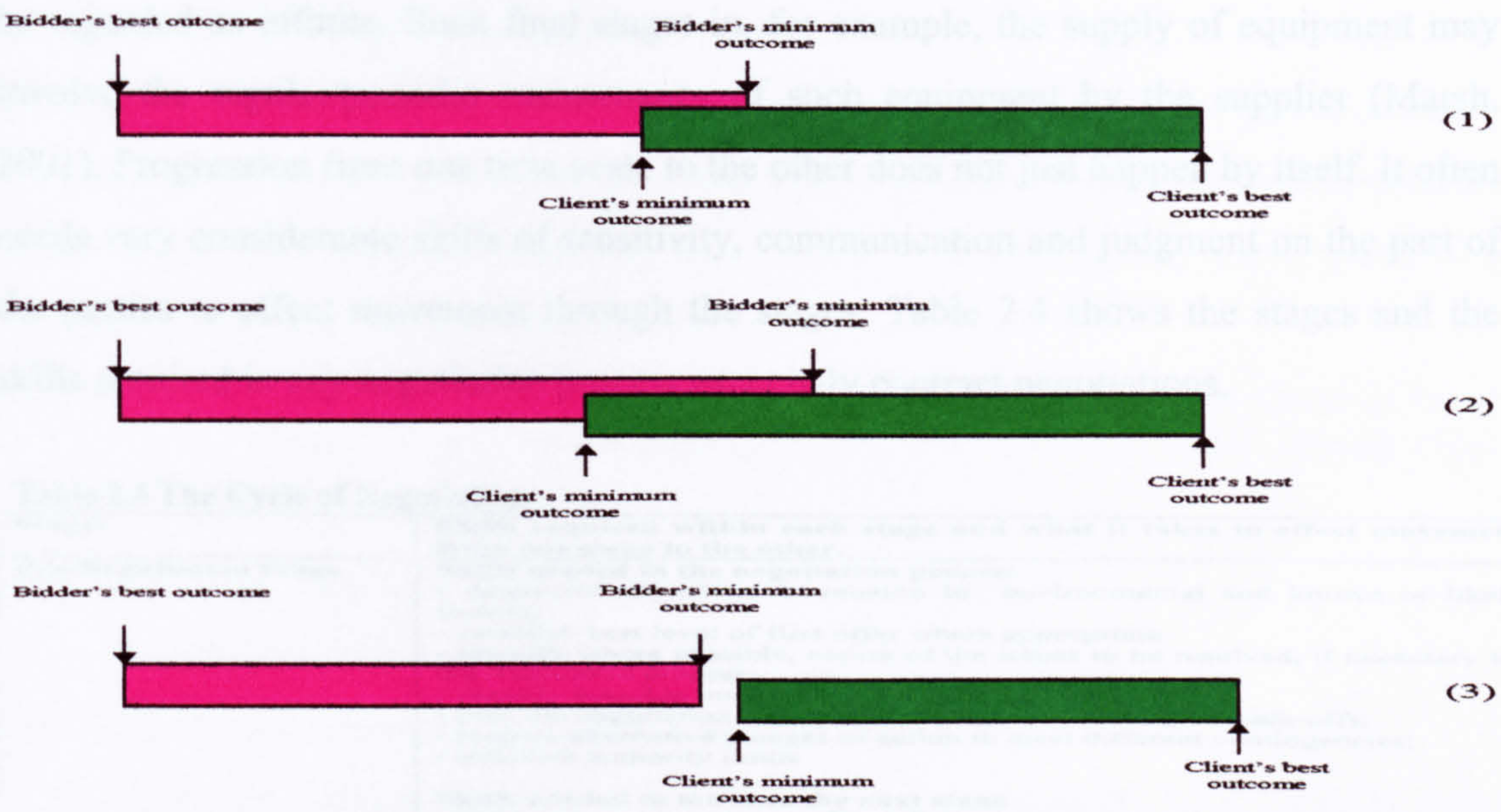



**Figure 2.18 The bargaining zone during negotiations**
Source: Adapted from McCall and Warrington (1989) and Kennedy et al (1987).

Strategically, where a party to the negotiation can be able to obtain information which s/he can use advantageously to alter the expectations of the other party by emphasizing the parties need for the benefits to be derived from the outcome of the negotiations, s/he will be attempting to alter the bargaining and the settlement areas and thus improving his satisfaction of the outcome of the negotiations. The bargaining and settlement areas can thus be altered through information elicited during the interactions which is a strategic function of the face-to-face situation (McCall & Warringotn, 1989).

### 2.5.3 The Cycle of negotiation

The process of negotiation takes place in a series of ascending time scales. First there is

the short period during when the negotiators must prepare for and execute the initial approach; then follows the period when the parties must reach agreement for the common interest to be realized. The third period is when the contract is at an implementation stage. During this period the agreement itself operates and may give rise to the need of further negotiations. Finally there is the very extended period within which the parties contemplate a continuing commercial relationship and which in certain circumstances can be regarded as infinite. Such final stages in, for example, the supply of equipment may involve the regular/periodic maintenance of such equipment by the supplier (Marsh, 2001). Progression from one time scale to the other does not just happen by itself. It often needs very considerable skills of sensitivity, communication and judgment on the part of the parties to effect movement through the stages. Table 2.4 shows the stages and the skills required in any negotiation process especially contract negotiations.

**Table 2.4 The Cycle of Negotiation**

| Stages | Skills required within each stage and what it takes to effect movement from one stage to the other. |
|---|---|
| **Pre-Negotiation Stage** | **Skills needed in the negotiation process**<br>- determine objectives in relation to environmental and known or likely factors;<br>- establish best level of first offer where appropriate<br>- identify where possible, nature of the issues to be resolved, if necessary by the interactive process;<br>- identify possible intangible issues<br>- plan the negotiations eg by identifying and building in trade-offs;<br>- prepare alternative courses of action to meet different contingencies;<br>- establish authority limits<br><br>**Skills needed to move to the next stage**<br>- make where necessary, written and/or oral presentations such as quotations, bids, or propositions for mutually dependent activities, of such a quality as to elicit a positive response to open negotiations |
| **Distributive Bargaining Stage** | **Skills needed in the negotiation process**<br>- test limits and further isolate issues;<br>- identify factors in the situation that affect relative power<br>- identify whether cooperative or competitive strategies should be adopted;<br>- establish preference and needs of the opposing party<br><br>**Skills needed to move to the next stage**<br>- convey without commitment, by use of indicating behaviour, implying willingness to move from and entrenched position provided some movement in made in return by the opposer<br>- achieve a positive response by appropriate verbal and non-verbal/cross cultural skills |
| **Integrative Bargaining Stage** | **Skills needed in the negotiation process**<br>- be aware of own and opponents style of behaviour;<br>- adopt appropriate conflict handling models;<br>- exercise the range of interpersonal attributes, especially those concerned with communication and influencing:<br>- maintain flexibility of movement be keeping issues linked in face of proposals and counter proposals<br>- elicit information regarding tangible and intangible issues and reformulate as necessary, objectives and strategy<br><br>**Skills needed to move to the next stage**<br>- persuade the opponent by moves and countermoves to bargain away what is unacceptable to him/her |
| **Decision-Making and Action Stage** | **Skills needed in the negotiation process**<br>- access interaction of factors bearing on outcome and to make a judgement by means of a package or packages, and of what is acceptable in terms of exchange or divisions of resources<br>- test for understanding and agreement<br>- select appropriate closing technique, eg summarizing or making a concession<br><br>**Skills needed to move to the next stage**<br>confirm in writing what has been agreed in a way which reflects the established understanding of the parties |
| **Post-Negotiation Stage** | **Skills needed in the negotiation process**<br>- draw up or accept contractual or other agreement which reflect the established understanding and the realities of legal interpretation<br>- provide for review or revision in the light of factor changes. |

Source: adapted from McCall and Warrington (1989)

Viewed in the context of the above stages of negotiation, the PPP procurement concept fully encompasses all the above time scales, a process that involves, short-listing, invitation to negotiate, submission of tenders, and tender negotiations and the operating phase where there would continually be opportunities to reopen certain aspects of the contract due to technological changes over time.

## 2.6 The role of *Time* in Contract Negotiations

Time plays two principal functions in any contract negotiations; i.e. time as a function of economic consequence in terms of cost, and time as strategic and psychological element of the negotiation process. According to Kennedy *et al* (1987), any party going to a negotiating table sets his/her optimal outcome based on:

a) the time which would be expended to secure each outcome over the range of those foreseen as possible and the related time cost and discount factor among other considerations.

b) the opponent's resistance to a range of possible demands.

### 2.6.1 Time as a function of Economic Consequences

Time represents a critical function of the bargaining process itself. Time limits at some stage in the negotiations, are the rule rather than the exception in every commercial and contractual practice. The weighting to be given to time factor relative to the achievement of the outcome of a negotiation will reflect not only the cost involved and the discounting loss but also the need to secure the business quickly in relation to forward orders and work in hand in the case of the contractor. In respect of the client organization, this may represent the benefits lost as a result of the delays in bringing the project forward for the services to be delivered. These costs for the public sector client could be an embarrassment and a strain on existing facilities for example school projects.

A contractor or bidder's influence on the time scale for a contract award arises first from the levels of the initial offer. In general the higher the initial offer, provided that is not so high as to kick him/her out of the competition or the bid being recognized as pure 'padding', the longer the negotiations will take. The second way in which the contractor

influences the negotiating time is through his/her decision regarding the rate at which s/he will concede and the minimum bargain s/he is willing to accept. The more favourable the bargain required by the contractor, the longer will be the negotiating period and hence the higher the time cost may be.

The decision rule for any contractor submitting a bid is to submit the bid at a level which will maximize his/her subjective utility value. The first influence on the contractor in determining the conditional utility value to him/her of a bid at any particular price level will be the profit contribution given by that price level. Other factors may include the longer term marketing benefits which the contractor might derive from an award of the project, which may include securing the recognition as a competent contractor in the particular market through the prestige value of the contract and the having the opportunity to obtain a follow-on business (Marsh, 2001).

During any contract negotiation, the more favaourable the term demanded by the client side the longer the likely of the negotiations prolonging unnecessarily and the higher will be the time cost. Theses cost could essentially be in the form of:

i) The loss of revenue or additional expenditure in which the client will be involved due to delay in starting the works and therefore completing it and the associated loss of revenue if it a commercial venture; and at the same time involving the client in paying interest charges on capital already expended.

ii) If the tender is not on fixed price basis, the escalating costs for the works being completed later especially in times of inflation could erode the expected gains from further negotiations.

iii) The actual cost of the negotiation itself in terms of the allocation of staff involved and those of the supporting staff to the negotiations

iv) Prolonged negotiations can also render the validity periods of the tender to lapse. In situations where the contractors finds that s/he will be in better position if the tender is annulled, the entire pre-contract activities could be an exercise in futility, and at an immense cost to the client.

v) Dislocation costs whereby works may have to be carried out at overtime hours in order to meet deadlines, all at an extra cost.

In the same vein the contractor suffers time costs in terms of manpower, the loss of possible revenue by not picking up some other competing projects which would probably have taken off much more quickly than the one under negotiations. Interest charges on funds invested in the preparation of the tender could also be mounting. In giving concessions therefore, the contractor will weigh the level of the time cost against the concession s/he expects from the client. Where the time cost is considered to be rising higher than the concession, the tendency would be to give in rather than risk a no bargain.

### 2.6.2 Time as a strategic and psychological tool

At the very outset of the negotiation, a negotiating time frame or limit could be established, or in situations where a specific time limit does not exist, one is subsequently created unilaterally by one side issuing a demand for the negotiation to be completed by a defined date, often accompanied by a statement as to the terms upon which s/he requires agreement to be reached. An approaching deadline thus brings pressure to bear which actually changes the least favourable terms upon which each party is willing to settle. Strategically, the stronger party within the negotiation could impose a time limit to the bargaining process and follow it with a threat with full commitment to carry out such threat. These threats could be in the form of stating that if a particular concession is not reciprocated by a particular time and date then s/he will pull out of the deal knowing very well that a no bargain will hurt the weaker party more (Kennedy *et al*, 1987).

The deterrent effect of any threat will depend on the extent of commitment by the person making the threat to carry it out, and the degree to which the other party believes the threat can be carried out which is further influenced by latter's perception of the level of injury he/she would suffer as a result. This loss/injury could be counted in both economic and personal injury terms i.e. injury to his her own personal reputation in terms of his/her personal goals. Within such dilemma, a negotiator will only put his/her reputation at stake after carefully weighing the costs of the threat being implemented. The authority and reputation of the person issuing the threat thus becomes a big factor. This authority

and strength may be obtained in a variety of ways – through personal experience and expertise, through the power base of the organization the negotiator represents; and the level of dependence of the one party on the other (McCall and Warrington, 1989).

Within the context of PPP contract negotiations, a dedicated bid manager with the right level of authority and reputation could thus effect a speedy negotiation with use of subtle threats. Same could be said of the public sector team represented by powerful champions with the appropriate amount of authority. The skills and personals traits of the negotiation team leader will therefore have a profound effect on the negotiation process in terms of how long it takes to conclude the deal. Some of these will include his ability to lead a negotiating team as opposed to any purely technical skills he may possess; of generating enthusiasm in his team; maintaining their morale under all conditions; and obtaining from each member of the team their maximum contribution which s/he is capable of providing; and flexible communication during the negotiations and with members of the organization s/he is representing in respect of the direction to take.

Time pressure can also be created in the opposite direction where, for example, one party during the negotiation deliberately extends the negotiation so that the other party is left uncertain of the former's real intentions. This tactics is most effectively used where the client is negotiating with two or more suppliers. This situation could be likened to where the second lowest bidder is put on hold in the case of some earlier PPP procurements. This creates a nervous strain on the private sector negotiator. The result could be an irresistible temptation to accept terms and/or give concessions that under normal situations would not have been given.

## 2.7 Interacting factors that influence negotiation outcomes

McCall & Warrington (1989) developed an outline of interplay of factors that influence the conduct and outcome of negotiations. They identified four main categories of influence centers on individual negotiators. These main centers of influence are the behavioural predisposition of the negotiator, their influence strategies and skills, the

situational influences and the environmental influences. Behavioural disposition accounts for such elements as the self image of the negotiator, his/her motives, perceptions and attitudes; interpersonal orientation and sensitivity to interpersonal relationships; cooperative/competitive disposition; experience; and willingness to take risks. The influence strategies and skills of parties would encompass such factors as the level of the presentation of the case; the level of the proposals; their power base; communication skills; and conflict handling modes. On the other hand, the situational factors may include such elements as conflicts of interest and/or rights; the degree of mutual dependence of the parties and the distribution of power between them; the objective of the parties; and the level of the first offer. The environmental influences may include macro environment such as the legal, political, economic and technological factors; and the micro environment relating to the organizational strategies and structures. The outline of these influence factors is as shown in Figure 2.19 below.

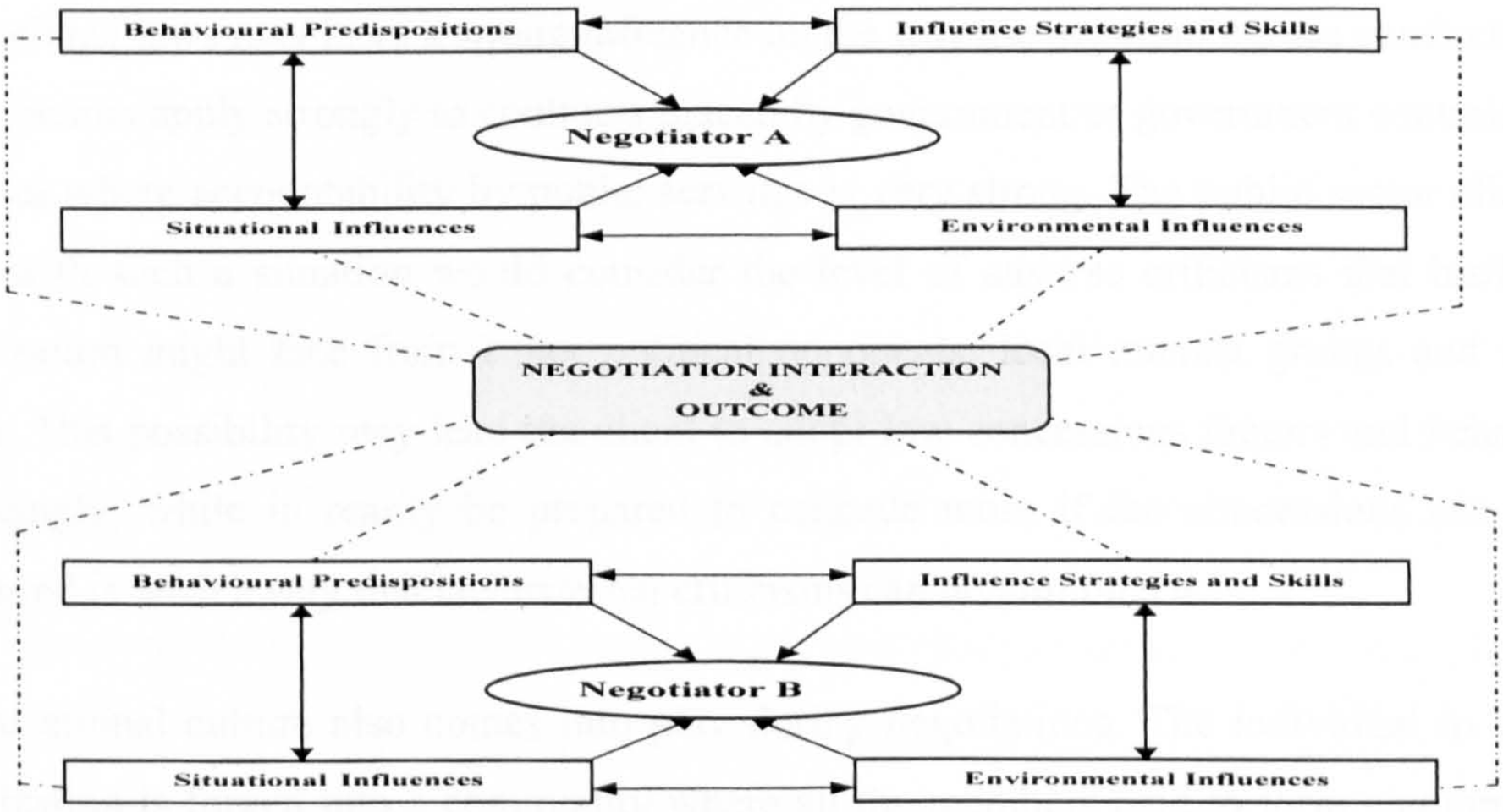



**Figure 2.19 Negotiating factor interactions**

Source: Adapted form McCall & Warrington (1989)

Viewed in the light of the above outline, past precedents which a contractor has established with the client and the contractor's experience in dealing with the individual negotiators for the client, the personality of the individual negotiators for each side, and

their knowledge of and respect for each other's skill, will come into play during the negotiations. Additionally, the way the client views his/her long term relationship with the contractor and his/her expectation of the contractor's willingness to respect the client's viewpoint taking into account the prospect of future business may influence the conduct of the negotiations and its outcome. A situational influence with respect to the objectives of the parties in negotiating the contract may include the effect which the granting of the concessions will have on the client's business with other firms, and the ratio which the contractor's business with the client bears to client's business as a whole in the particular field. The client is more likely to grant concessions if these can be isolated from the remainder of his/her business and if the proportion of the total business affected by such concession is small.

On the environmental influences, mandatory requirements imposed on the client either from the existence of rules internal to the organization, national laws and in some cases international laws may have a strong influence on the way the negotiations are conducted. These factors apply strongly to contracts placed by government or government controlled agencies where accountability by public servants is very strong. The public sector client faced with such a situation would consider the level of adverse criticisms that his/her organization might face from either political opponents, local interest groups and the media. This possibility may lead the client to adopt low concessions factors and behave accordingly, while in reality be prepared to concede more if the concessions can be structured in such a way that any external criticisms can be minimized.

Organizational culture also comes into play during negotiations. The individual in any organization is forged into a community where all the members tend to form a common mental set or perceptions. Thus while the private sector organization may as a result of its organizational culture pursue profit as its main motivational goal and thus groomed in that cultural mindset, the public sector procurer may, as a result of the rigid rules and regulations relating to accountability, become cocooned in these rules and regulations as part of its culture. Every organization thus manifests a strong evidence of providing a sub-culture which reflects a distinctive set of meanings shared by a group of people

whose form of behaviour differs to some extent from those of other organizations (Turner, 1971). Anyone entering into negotiation with a public sector client should then know that s/he is going to bargain with an opponent who operates against a background of decision rules which differ in many ways from those of the private sector - differences that have important implications for the outcome of the negotiations. The organization member then turns to become what s/he speaks and writes, particularly in an organizational context. In this respect both the public sector and the private sector at a negotiating table may approach same issues in differing perspectives and thus making it quite difficult to reach early agreement on issues.

One of the ways of overcoming these cultural barriers would be the opportunities provided when both parties work together over a period of time or having worked together before the outset of the new project. Having worked together before may also increase the level of socialization necessary for cooperative and mutually beneficial form of bargaining identified under integrative bargaining. The complete communication framework of words, actions posture, gestures, tones of voice, facial expressions, the way time and work are handled , the way one defends him/herself; are all a complete communication systems with meaning that can only be read correctly only when the parties are familiar with each other. Once that awareness is achieved, a negotiator will be in a position to exercise the cultural sensitivity necessary for successful social interaction between negotiators of deferring organizational and cultural backgrounds (Hall, 2000).

The cultural variability is not only an issue between the private sector and the public sector client alone. The formation of a Special Purpose Vehicle by the private sector for any PPP project involves the coming together of a number of organizations who may have varying degrees of objectives and cultural mindsets. There is therefore bound to be tendencies of differentiation among the individual private sector companies forming the consortium. These differences may also have a significant influence on the negotiation process and outcome. Leadership then becomes a critical element in the process towards achieving a successful negotiation outcome. The leader is an integral part of the group organization. The most significant factor in the exercise of leadership in the negotiation

process is the personal ties between the leader and members of the team and acting as a strong champion with a conviction that the process will work to their mutual benefit.

One important factor which arises from the mutual dependence inherent in any voluntary relationships as envisaged through negotiations for such long term contracts as the PPP/PFI, is the relative power that exists between the two organizations/parties. If here is an over dependence of one party on another, that party is in a position of relative weakness in relation to the other party. This will thus have a bearing on the negotiation objectives and eventual outcome, especially where the stronger party decides to exercise that power. These kinds of power may come from a variety of sources. They could be environmental, consisting of such issues as the level of competition within the industry. Where, for example, there is a prolonged absence of traditional projects within the industry, competition for projects of the PPP/PFI type may be fierce, unless the project is so unique that only a limited number of firms can bid for it. In situations of such nature, the client is in a relatively stronger position of power and may be able to determine the terms. On the other hand, a bidder eager to secure the project so as to maintain his/her fixed overheads may be more flexible during the negotiations. This sort of power may be termed an external environment factor as neither party has in effect any significant control over it. If, however, there is a flood of traditional projects in the economy, bidders will be in a position of stronger relative power. In fact the relative power between the parties can change over the course of the negotiations especially when the negotiating period becomes so prolonged as was witnessed in the early days of the PPP/PFI procurement, where some prospective contractors had to withdraw from the competitions and in some instances there were no responses to the invitations to negotiate resulting in abortive bids.

## 2.8 Summary

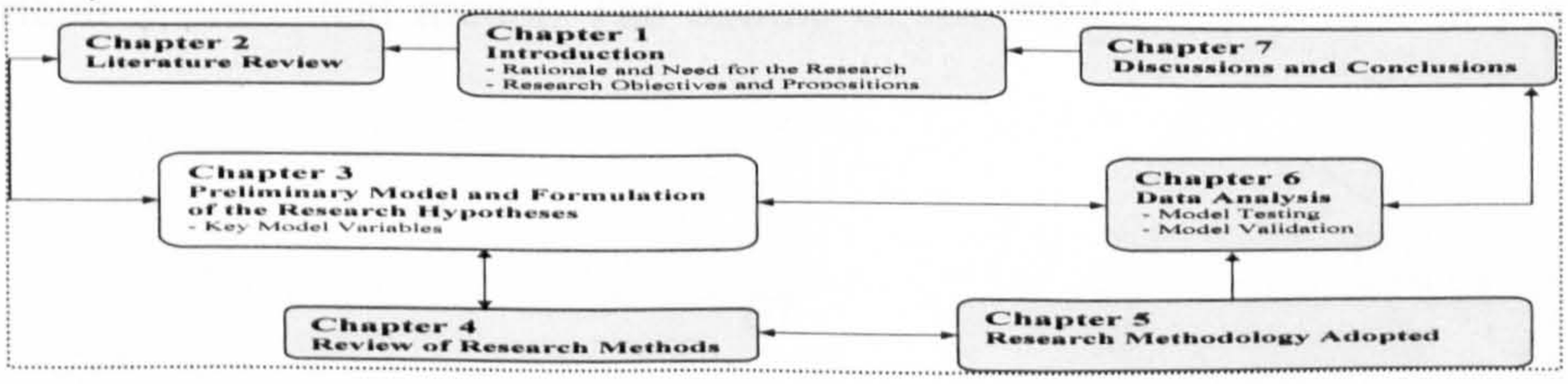
In any major business transaction such as those envisaged under the PPP/PFI procurement, the goals and objectives desired by one party may create actual or potential costs or risks for the other party. Under such circumstance therefore, responsibilities,

costs, risks and the rewards need to be discussed, understood, and allocated in an honest and open manner through an effort designed to avoid misunderstanding and deception. This can only be achieved through a sound negotiation framework where both parties work together in a cooperative negotiating environment for their mutual and optimum benefit. Despite the eagerness of national and local governments to adopt the PPP procurement route as a means of clearing the backlog in infrastructure development and maintenance, the literature revealed a growing concern for the rather long delays and the excessive bidding costs associated with the process towards the formalization of the contracts due to the rather protracted negotiations.

The literature on negotiation/bargaining theory revealed certain important elements which could be beneficially applied to the negotiating processes when procuring the PPP/PFI projects. Chapter 3 develops on this negotiation theory and concepts in line with the principles and procedures of PPP/PFI pre-contract negotiation process by clearly identifying the key factors necessary in pushing forward the negotiation process in an efficient and timely manner. This will be achieved through identifying and analyzing attributes relating to the consortium, the public sector procurer, the project and the external environment that have profound influence on the outcome of the pre-contract negotiation processes.

# Chapter 3: Formulation of the preliminary model and research hypotheses





# Chapter 3: Formulation of the preliminary model and research hypotheses

## 3.1 Introduction

The purpose of this chapter is to ascertain the strategic choice in selecting topical domains for the development of the multi-attribute hierarchical model based on the review of the literature on contract negotiations and bargaining theory. The process therefore involves scanning the existing literature in search of the constructs that have some established evidence of empirical reliability and validity in negotiation theory in particular and in the management literature in general. The comprehensive topical content of the preliminary model will be displayed at the end of the chapter. This preliminary model will then act as a guide in the development of the survey questionnaire based on the underlying dimensions of the topical content.

The most prevalent concern in bargaining research has been to identify the factors that determine the outcome of the negotiation in terms of *a) whether an agreement will be reached, b) the amount of time required to reach an agreement, c) the nature of the agreement, and d) the degree of satisfaction with the agreement and the commitment to carry it out* (Naquin, 2003; Maxwell *et al,* 2003; Brett *et al*, 1998; Phatak & Habib 1996; McCall & Warrington, 1989).

## 3.2 Outline of the Preliminary Model

The review of the literature in Chapter 2 and the various interviews conducted during the early stages of this study and information gathered at workshops on the PPP/PFI, identified the key elements that may influence the outcome of any negotiations and in particular PPP/PFI contract negotiations. Each component of the model will be considered in detail in order to unearth their underlying dimensions which will then be subjected to statistical analysis after a questionnaire survey in order to develop a generic multi-attribute hierarchical model. The outline of the model is provided in Figure 3.1 overleaf.

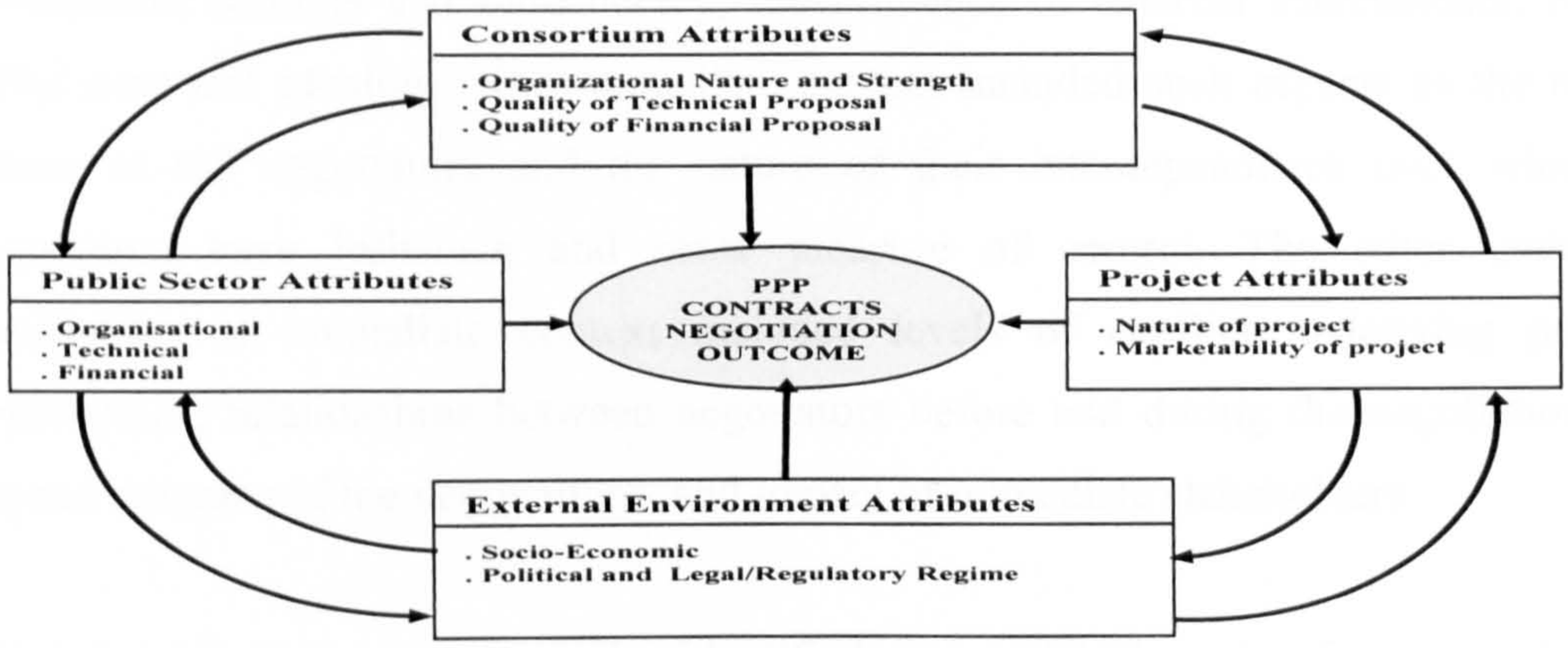



**Figure 3.1 PPP & Contract Negotiations: Outline of the Generic Model**

This model is based fundamentally on the Negotiaition Factor Interaction model developed by McCall and Warrington, (1989) as shown in Figure 3.2, and the contextual model proposed by Phatak and Habib (1996). McCall and Warrington, (1989) in their research on commercial negotiations, identified such main factors as behavioural disposition of the parties to the negotiation, and their influence strategies as affecting the outcome of commercial negotiations. They included other factors as the situational influences and the external environmental influences.

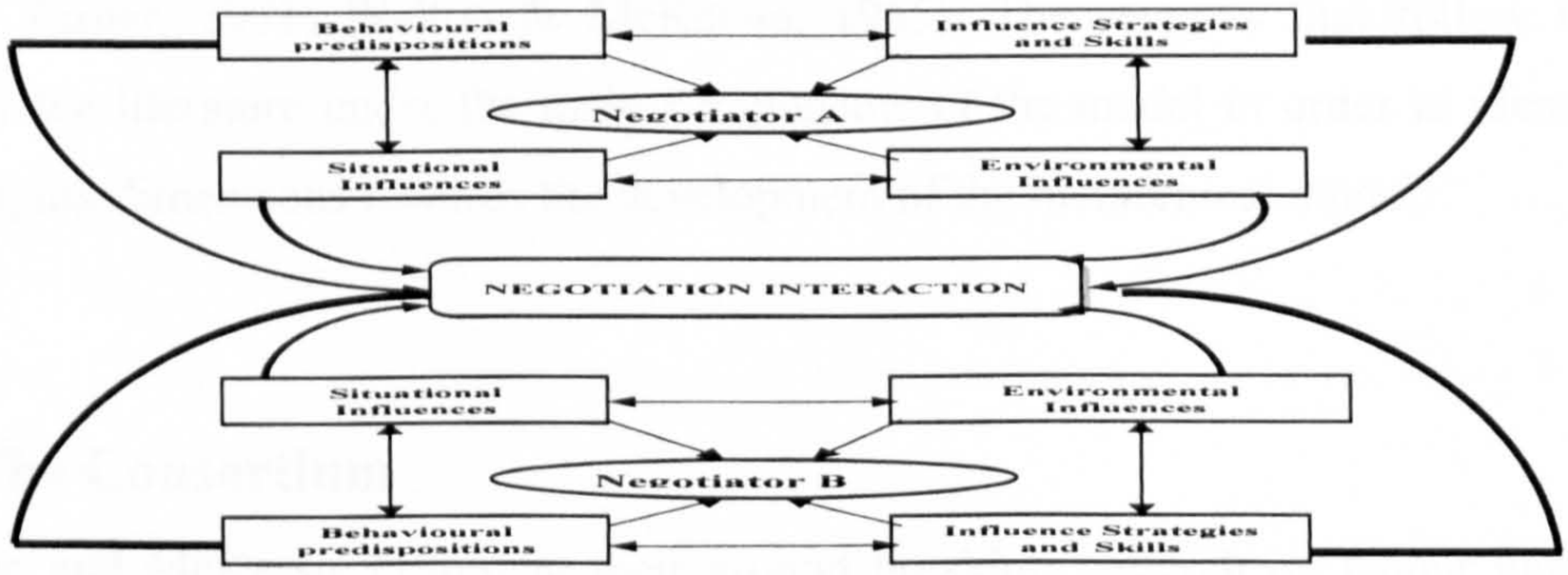



**Figure 3.2 Negotiating Factor Interactions**
Source: adapted from McCall & Warrington (1989)

The Phatab and Habib (1996) model, considered the negotiation process and outcome in the context of two major influencing factors – the *immediate context* and the *external environment context.* They linked the external environmental context to forces that are beyond the control of either party involved in the negotiations - the dimensions of which

included legal and political pluralism, currency fluctuations and exchange controls, government controls and bureaucracy, the influence of external stakeholders, cultural differences and ideology. The immediate context included such aspects as the relative power of the negotiators and the nature of their interdependence over which the negotiators have influence and some measure of control. The other underlying dimensions of immediate context included levels of conflict underlying potential negotiations, relationships between negotiators before and during the negotiations, the desired outcome of the negotiations, and impact of immediate stakeholders.

A number of other researchers also identified a host of influencing factors, such as the manner in which the case is presented, the pattern of moves, communication and the development of thrust; the negotiators' motives, personal values, competitive/cooperative disposition, previous interactions, experience and willingness to take risks. Others factors include the objectives of the parties in relation to the perceived issues, the level of the first offer, the degree of mutual dependence of the parties and the distribution of power between them, the extent of conflict of interest and perceptual distortions, and the degree of overlap between the objectives of the two parties (Naquin, 2003; Maxwell *et al,* 2003; Brett et al, 1998; Kennedy *et al*, 1987; Marsh, 2001; Webster, 1984; Raifa H, 1982; Ury W, 1992; Hill & Hillier, 1977; Seaton A.V. 1976; Rubin & Brown, 1975; Stephenson, 1971; Turner, 1971; Walton & McKersie, 1965). The sections that follow therefore review the literature under the main components of the model in order to identify their underlying dimensions towards the development of the hierarchical model.

## 3.3 The Consortium

Walton and McKersie (1965) in their ground breaking research on labour negotiations emphasized four basic ingredients of any meaningful negotiations, i.e. (i) a configuration and a dynamic interaction of the negotiating parties; (ii) an awareness of inherent conflict of interest in a decision-making situation out of which the parties must wish to solve common problems or wish to integrate their interests in other ways; (iii) the desire to change or maintain the basic attitude of trust and friendliness between them; and (iv) the

parties being responsible for achieving consensus or acceptance within their respective groups.

The PPP concept of procuring public projects is an embodiment of a long-term relationship just as it is in labour-management relationships. The very nature of the way it is organized and the number of parties involved makes the above ingredients very relevant in the context of the PPP contract negotiations. Not only are the parties striving to resolve their differences in term of the project requirements but they must equally strive to satisfy the varying objectives of the respective interest groups within both the public sector organization and the private sector consortium.

A number of researchers have examined the role contractors play in the general procurement of infrastructure projects. Kumaraswamy and Dissanayaka (1998) for example identified available capacity of the contracting industry and the performance of the contractors as some of the influencing factors in the choice of even a procurement strategy, since the choice of the strategy may have a profound effect on the eventual outcome of the project.

### 3.3.1 Experience

According Brehmer and Hammond (1977), successful negotiation is hard to achieve, not only because the judgment tasks are complex but also because judgments are produced by a poorly understood process. They argued that human judgment is best characterized as a quasi-rational process where there is interplay of a mixture of analysis, intuition and experience. *Experience* in the context of this research has been grouped into three categories: –

a) experience of the firms constituting the Consortium of having worked together in the past,

b) experience of the Consortium having worked with the public sector organization, and

c) Consortium's previous experience in project procurement through the PPP route.

Within the negotiation and bargaining literature it has been documented that a bargainer will fail to make concessions because s/he distrusts the opponents (Walton & McKersie, 1965). The opportunity of having worked with a particular client in the past would provide an avenue to develop trust and thus enhance the possibility of reaching an early and mutually negotiated settlement.

Negotiation is an art for which skills must be developed. Over the past three decades, infrastructure procurement has primarily been based on the traditional form of procurement where the client clearly defines what is to be produced. The result is that bidders are literally bidding from a common platform where the successful bidder is chosen principally on the basis of the lowest priced bid as pre-qualification would have determined the technical capabilities of the contractors in advance. This traditional form of procuring the services of contractors could be likened to what is referred to in the marketing literature as *routinized-exhange* where the terms are established by administered programmes of pricing and distribution (Kotler, 1997). Hence it would be fair to conclude that the relevant skills for pre-contract negotiations have some decades now been lacking both within the private sector and public sector.

Citing the works of Dobler (1990), Kotler indicated that contract negotiations become necessary:

- when many factors bear not only on price, but also on quality and service;
- when business risks cannot be predetermined accurately;
- when a long period of time is required to produce the item or service;
- when production is interrupted frequently because of frequent change order.

The concept of the PPP procurement strategy has of necessity introduced the element of negotiation as bidders are now being called upon not only to submit proposals and innovative designs that meet the output specifications of the client, but also the long term commitment of maintaining and operating the constructed facilities for periods of up to 30 years or more. Infrastructure procurement is thus moving away from the domain of a one-off *transaction-oriented* to that of *relationship-oriented* form of contracting, the later

of which negotiation becomes an inevitable element in establishing the necessary relationships, which is referred to in marketing literature as customer-delivered value which incorporates the difference between total customer value and total customer cost. Total customer value covers such elements as product value, services value, personnel value and image value; while total customer cost include monetary cost, time cost, energy cost and psychic cost (Kotler, 1997).

Trust is also vital for the success of such relationship-transactions and this can only be established through initial dialogue and discussions. Hammer & Yukl (1977) citing the works of Siegel and Farouker affirmed that as negotiations progress the successive bids seem to give experience to the bargainer enabling him/her to establish a realistic level of aspiration; a situation that enables him/her to find means by which concessions can be made to the opponent. The repeated participation in the process will therefore not only sharpen the skills of the negotiator but where it involves two opposing parties having interacted in an earlier project, it should enhance the process further.

There is evidence in the management literature that as teams work together they begin to form and norm together. If the Consortium members have had the opportunity of having worked to together, this would help the process of bonding together through the development of thrusting relationships, an ingredient for quick and sound decision making and consensus building. Obviously, the levels of concessions to be offered at the negotiating table with the client would need to be discussed and agreed between the Consortium members, and where thrust already exists agreements on the levels would be made much easier. According to Pruit & Lewis (1977), for aspirations to rise, people must be aware of their own interests and have some faith in the possibility of furthering them. Such awareness and faith often develop in cohesive groups of people with common interests who discuss their situations with one another. Such group effects can contribute to joint outcome provided that as aspirations rise, a problem solving orientation is maintained within the group. The development of these aspirations and trust can come about in the main through the coming together and working towards a common cause over time.

The PPP procurement requires the Consortium to take on board those risks that traditionally fall in the domain of the public sector client. As a result, and in order to safeguard against the uncertainties that may result from some of these risks, the Consortium is most likely to pitch their aspirations very high. In the same vein, the pressure on the public sector to obtain value for money and to be seen to display accountability in a domain which may be considered as unfamiliar territory, their aspirations levels would equally be high. Where the Consortium and the public sector organization have had the opportunity of working together in the past, the development of thrust would enable both sides to adopt integrative bargaining strategy where both sides would make a joint effort of increasing their total utility by broadening the pie.

Pruit & Lewis (1977), postulated that where limits or aspirations are high, integrative bargaining reduces the likelihood that negotiations will fail, by making it possible to locate options that satisfy everybody's ultimate limits, and that it leads to speedier settlements. It also reduces the danger that one or both parties will repudiate any agreements secured; as they are generally more satisfactory to both parties. Improved relationships also develop as a result, including improved organizational effectiveness.

Reciprocity, which refers to the desire to repay the other party for a past favour, can contribute to the development of integrative bargaining, the bedrock of which is thrust. Research also suggests that friends are more responsive to the needs of one another than are strangers, and where there is an element of trust, the level of information exchange increases thereby inducing integrative negotiating behaviour (Pruit and Lewis, 1977). To them, this problem solving approach to bargaining is encouraged by positive feelings, interdependence, kinship, a perception of value congruence or common fate and an apprehension about the development of a conflict spiral. Hence physical intimacy may discourage distributive behaviour and encourage problem solving and the development of integrative bargaining. They cited the works of Milgram (1974) who found that it is easier to impose costs on another person when he is at a distance than when he is close at hand. Hopmann and Walcott (1976) call this the friendliness-hostility dimension in negotiations in their research on the outcome of the international negotiations on the

Partial Nuclear Test Ban Treaty, in which they found that the high level of hostility between the then Soviet Union and the US, resulted in both sides adopting harder bargaining strategy at the outset of the negotiations. This hard line strategy however significantly moved toward soft strategy over the period between December 1962 and June 1963 as each party began to know each other better leading to the conclusion of agreements.

### 3.3.2 Reputation

One of the characteristic attributes that effective negotiators make use of in order to obtain agreement is *power,* which comes in all forms such as coercive power, legitimate power, resource base and control of such resources, and expert power. Bargaining has an element of persuasive communication and one of the established social-psychology principles is that an expert is superior to a non-expert in gaining conformity to persuasive communications especially when this expert knowledge is being applied within the environment where that knowledge is relevant. Tedeschi and Bonoma, (1977) found that expertise enhances the effectiveness of warnings and recommendations since a source's reputation for expertise apparently leads others to assume that that person's credibility is high. A Consortium with previous experience in PPP procurement should thus have acquired expert knowledge in this field of procurement and would make good use of it during negotiations in order to push forward an agreement on relevant issues. This level of knowledge will naturally induce believability in the proposal put forward by such a Consortium.

In addition to the above expert power base, where the Consortium enjoys a good reputation of meeting targets in their previous PPP projects, it gives them the added status power necessary to get through the negotiations. High status contributes to the believability of a source's communication and hence to the effectiveness of his persuasions during the bargaining. Taken at individual levels therefore, such organizations may have in their team experts that may be designated as dedicated bid managers and champions whose persuasive abilities will help push the negotiation process forward.

### 3.3.3 The role of Champions

One other complementary strategy than can be used to a great advantage is that of aggregating issues such as in logrolling, or systematically trading off bundles of issues that are desirable to the other party but not important to self for bundles of issues not important to the other party but important to self. One thing that expertise does is that a person with such an expert knowledge is able to see through issues quickly and break them down into smaller components or be able to bundle them in a manner that can facilitate the negotiation process. It is expected therefore that the presence of a dedicated *Bid Manager* and a champion within the Consortium will help enhance this vital element in successful and speedier negotiations.

Additionally, as demonstrated in the literature on social psychology, one determinant of a negotiator's initial orientation to a negotiating situation is his personality. His/her predisposition and expectations about the other party's behaviour at the negotiation can be affected by his/her personality traits (Rubin & Brown, 1975). However, according to Hermann and Cogan (1977), the strength of this relationship between personality and initial definition of the situation depends on the constraints imposed on the negotiator by the party that s/he represents. The less constrained the negotiator, the more likely his personality is to influence the initial definition of the situation. To them, when a negotiator enters into bargaining with a representative of the other party, a stage of exploration begins as each learns about the positions and intentions of the other and the constraints on him/her. If the negotiators are not too greatly constrained by the parties they represent, and if they have characteristics that make them interpersonally sensitive to each other, both sides begin to quickly see the opportunities for give and take. This will thus avoid either a deadlock or decidedly low progress towards reaching agreement due to the give and take necessary to reach early agreement that takes place. They argue that personality can influence initial behaviour because individuals may have little to rely on except their predisposition and past experience in defining the situation. However, once the interaction is underway, the personality and behaviour of the opponent becomes important as each opponent reacts in turn to the other. The role of *Champions* and dedicated *Bid Managers* within both the private sector Consortium and the public sector

client organization may therefore fit squarely into this social psychology evidence in literature.

On the other hand, quite frequently during negotiations, there comes a time when either party is threatened by face and may have to undertake certain face-saving or face restoration measures. In situations of this nature, referents such as third parties not directly involved at the negotiating table may provide the impetus to regulate this face-saving or face-restoration behaviour. In such circumstances, it is not uncommon to find negotiators wanting to defer certain decisions until they confer with their superiors. Champions within both organizations to the PPP procurement could thus play a meaningful role in this respect to avoid deadlocks, by appealing to a negotiator's image or intervene in ways that have implications of saving and/or restoring face and thus progressing the process toward reaching early agreement.

The negotiation literature reveals what may be termed *interpersonal comparisons* in a conflict relationship. Stern *et al.* (1977), indicate that an exchange of persons between two organizations might require the social actors participating in the exchange be chosen from comparable levels within each organization so as not to produce disparities in status. To them, to do otherwise would create a situation of imbalance, marked by loss of self-esteem, or induce other emotional reactions that could interfere with the establishment of cooperative relations during the negotiations. The appointment of a dedicated Bid Manager with high level of expertise on the side of the Consortium and an equally qualified person from the public sector organization should help eliminate this danger and induce an element of cooperative negotiations. Equally important is the element of *external comparison* within the negotiation process whereby the parties may look up to a third person who may have a strong influence on the outcome of the negotiations in respect of the pressures such third parties tend to exert on the negotiators. In this regards, the existence of champions within the Consortium who could drive the process and the presence of a strong support from the top level of the management structure of the public sector organizations may help speed up the process.

### 3.3.4 Strategic Business Interest

McClintock, (1977), during his empirical study on social motives and negotiation settings concluded that the behaviour of a party in a setting of outcome interdependence is a function of that party's motivational orientation, his/her strategy and his/her expectations regarding the behaviour of the other party. To him, given a choice among a set of available alternatives, the individual would select the alternative for which the perceived value of the accompanying outcome is as high as or higher than the values attached to any other alternative available at the time of the choice. Hence as shown in Figure 3.3, the private sector Consortium naturally enters the PPP project competition with certain strategic motives which begin to reflect during the negotiations.

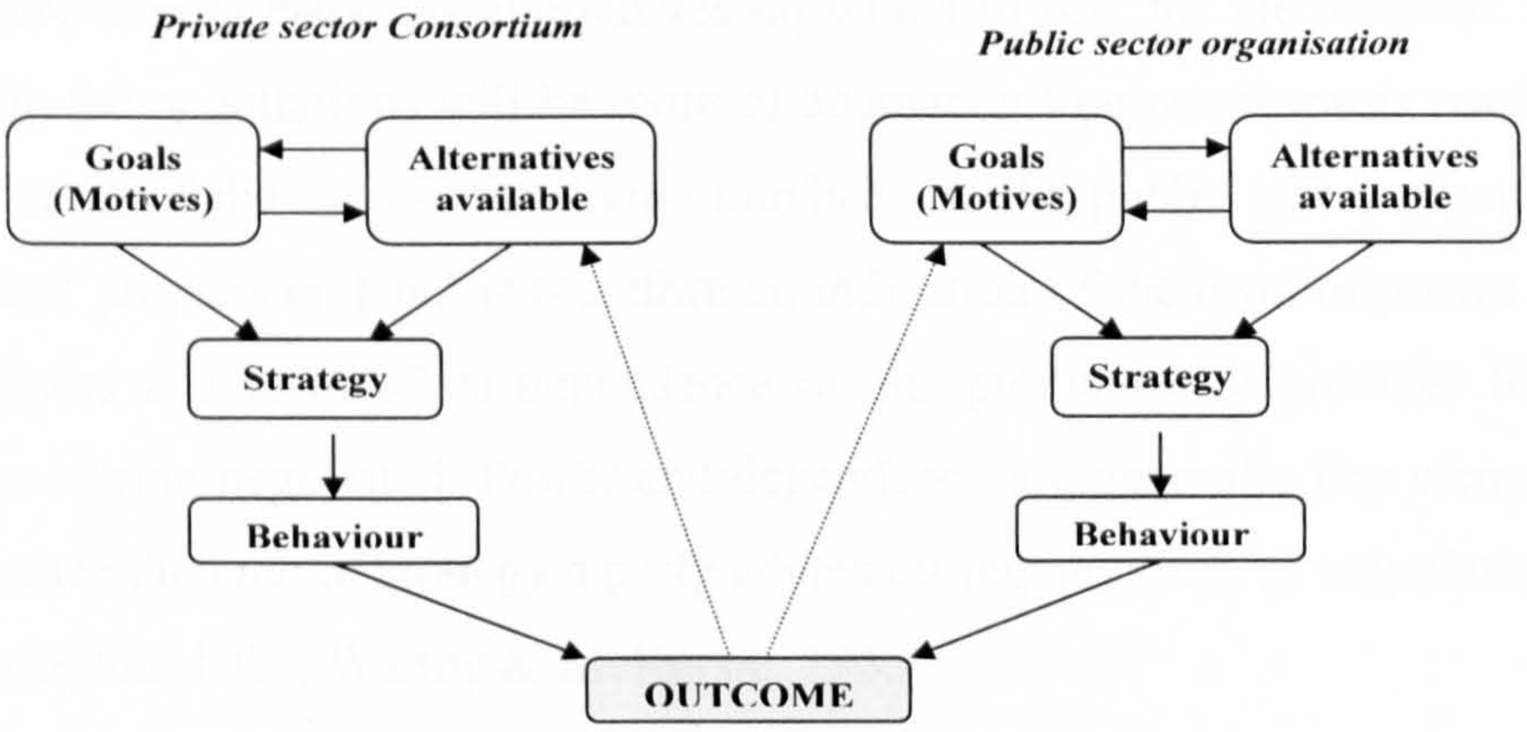



**Figure 3.3 Variables affecting decision making in settings of outcome interdependence**
Source: adapted from Mc Clintock (1977)

One would therefore expect that where the PPP procurement philosophy is part of the Consortium's strategic business interest there would be signs of commitment during the negotiations as the Consortium will be motivated towards reaching an early but effective outcome to enable it carve a niche in the market. This strategic business interest will also be greatly influenced by the job holdings (i.e. projects currently ongoing or due to start) of each individual members of the Consortium or the Consortium as an entity.

Business organizations faced with choice would select the alternative that affords the outcome with the highest expected value. Since every company has limited resources both physically and financially and also have a number of potentially desirable activities over which those resources could be employed, the scale of resources required at any one time to satisfy all those activities will be greater than those which the company possesses. A business's ability to make profits is thus dependent largely on how those resources at its disposal are effectively utilized on those activities which will provide the maximum return for the effort expended, over the time scale for which the business is being planned. It is therefore not unlikely that a contractor who has a number of traditional projects on hand would be hard on his client during the negotiations for any new project because s/he already has alternatives on which to rely for the moment. His/her attitude during the negotiations will be more of adamancy to move towards reaching the speedy resolution of the issues that divide him/her and the public sector organization. Current level of projects on hand is therefore an indication of the level of power the Consortium possesses and level of its dependence on the public sector procurer for the particular project being negotiated. Power and dependence are generally key elements that greatly influence the type of strategy a party adopts during any form of negotiations (McCall and Warrington, 1989; Walton & McKersie, 1965).

The formation of a bidding Consortium for a PPP project could be likened to the formation of coalitions of individual organizations or firms coming together for a common purpose. A coalition only succeeds to the extent that it is able to fulfill the purpose it sets for itself. According to Midgaard and Unerdale (1977), a rational actor would only seek to join such a coalition if s/he expects to achieve something more than that s/he could achieve him/herself by going it alone. The implication is that the coalition must pursue some purpose that the actor finds attractive and have no side effect that is detrimental to that purpose and must succeed in promoting its purpose. In addition, by joining such a coalition s/he would be hoping to improve the coalition purpose and/or contribute to its success. Individual and collective organizational goals therefore become the underlying motives of any Consortium.

It is not uncommon to find the private sector Consortium taking a proactive interest in bringing up a project forward where it is in its strategic interest to do so. A number of such instances abound in the developing countries where multi-national companies in a bid to expand and establish their foothold in particular countries put in the maximum effort to ensure that negotiations are concluded as quickly as possible especially where they have taken the initiative in the realization of the projects. On a particular design, finance and build road project in which the author was informed, the negotiating team members of the multi-national company were ever ready to work round the clock to conclude the contracts.

### 3.3.5 Financial Strength

As evidenced in the literature on negotiation theory, one of the sources of power employed during negotiations is that of the power of control over resources. The ability of the Consortium to provide equity and also be able to tie this equity in the project for long periods is an indication of their financial strength and power. This should act as an attribute that should convince the public sector procurer that the Consortium members are serious and committed to the project. Evidence produced in a research on BOT projects indicated that equity, if not demanded, is often expected of the Consortium by both the public sector clients and by the lending institutions supporting the project. This is because equity decreases the burden placed on projects to service debt and also signify the Consortium's faith in the viability of the project. Of the 38 BOT projects that Tiong (1995) reviewed, 26 requested for the provision of equity by the Consortium.

The ability to provide equity is therefore a show of strength and financial clout which in turn makes the Consortium's proposals attractive to the big time financial organizations to support them in the financing of the projects. Hence any financial guarantees that they provide to support their bids would be coming from institutions that have credibility. As believability in the instruments provided will induce trust, the negotiation process should thus be enhanced by these instruments or guarantees by contributing to a successful negotiation outcome.

### 3.3.6 Negotiating style adopted

Contract negotiations, like any social action, occur in the context of outcome interdependence between the participating parties. Hence not only achieving valued outcomes dependent upon the actions of others, but the very behaviour of one party may vary as a function of the behaviour of the other party. As observed by McClintock (1977), five motivational vectors are frequently seen in negotiating settings where there are two or three interdependent parties. These include the demonstration of altruism to the other party by attempting to maximize the opponent's outcome; maximizing joint outcomes through cooperative behaviour; attempting to maximize own outcomes through individualistic behaviour. These motivational factors are illustrated in Figure 3.4 below.

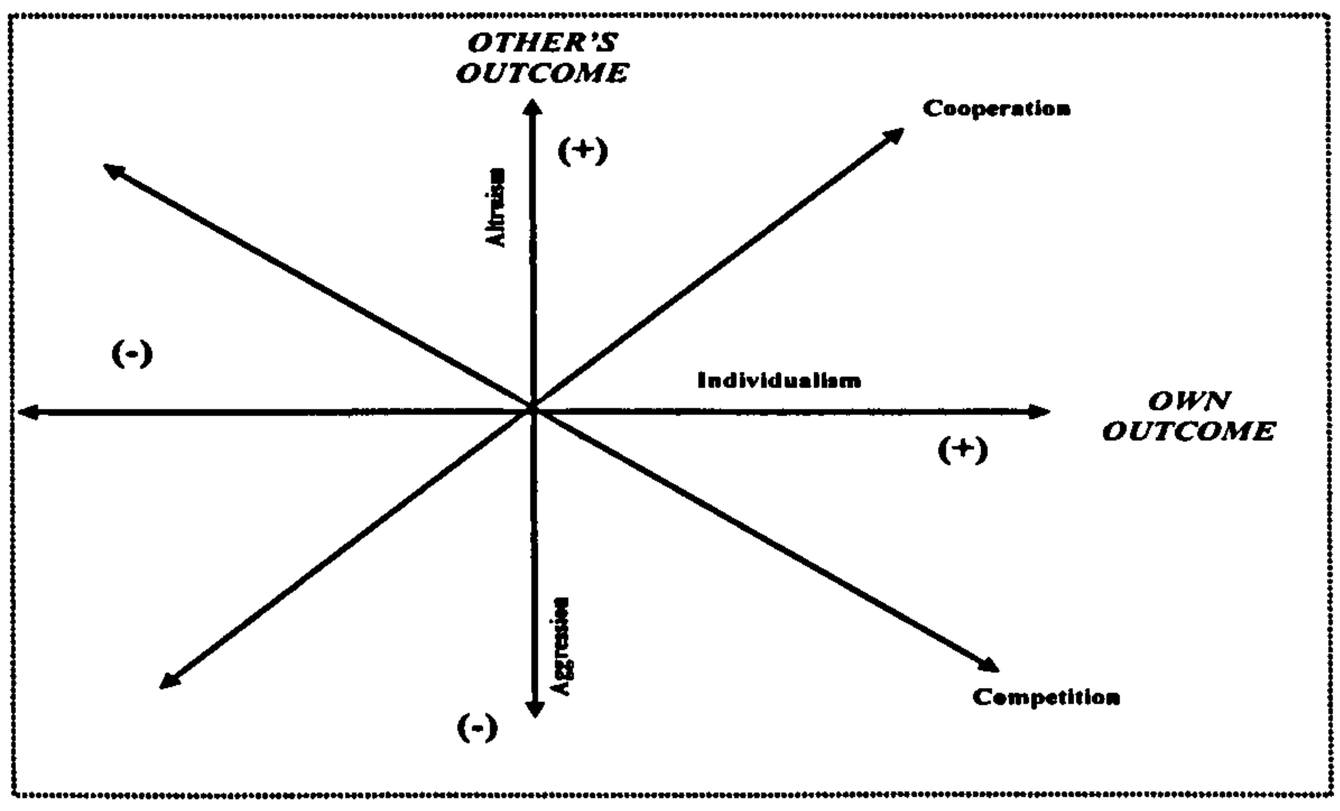



**Figure 3.4 Motivational Vectors during Negotiations**
Source: Adapted from McClintock

The other motivational factors include maximizing relative advantage of own over other's outcomes or minimizing relative advantage by acting competitively, and finally minimizing other's outcome through aggressive behaviour. The deployment of any of these modes of negotiating behaviour will evoke similar response from the other party as vividly demonstrated by research on the Prisoner's Dilemma (Pruit & Lewis 1977).

Any demonstration by the private sector Consortium of a predisposition towards cooperative/altruistic behaviour during the negotiations would signal a similar response

from the public sector negotiating team and thus lead to meaningful outcomes during the negotiations by eliminating antagonistic behaviour. The implication here is that the joint gains resulting from this kind of negotiations are increased outcomes for each party over and above their initial estimations. This form of negotiation behaviour is necessary if the gains of the rather long-term nature of the relationships expected under the PPP strategy are to be realized. *Open and frank communications* during the negotiations should therefore enhance this process. After all, problem solving should succeed where there are signs of openness and frankness. There should also be signs of not only committing oneself to the outcomes of each stage of the negotiations but the willingness to do so should be clearly demonstrated right from the onset of the negotiations. The ability to persevere even if the negotiations become protracted is also an indication of ones commitment to the process.

Equally, any demonstration of proportionate competition which implies that the private sector is willing to adopt an absolute level of competitive advantage, will also receive a similar response from the public sector. The relationships between the parties to a PPP contract are long term in nature (10 – 30 years). The development of an early rapport between the parties will very much enhance this partnership relationship for the effective delivery of the services. Both sides should therefore take a long term view of the relationship right at the negotiations stage of the contract as an early termination due to contractor default would indicate a major failure of the systems put in place to ensure satisfactory service delivery. A situation of this nature would also put the public sector organization in a situation where it may find it difficult to provide the services to the end users during the period when the search for a new service provider is underway.

Research has found that where both parties act in a spirit as if they were members of the same organization, there is a high level of information exchange during the negotiations. The result is that their joint gain at the end of the negotiations is higher because they tend to adopt an integrative form of negotiation which is more of problem-solving rather than the distributive type. This information exchange may include requesting the other party's reaction on the latest offer/concession which provides a feedback that enables the

offering party to devise a new offer which will be more to the liking of the other party (Walton & McKersie, 1965; Pruit & Lewis, 1977).

### 3.3.7 The multidisciplinary nature of the Consortium

The Consortia bidding for PPP projects are typically constituted by a number of firms all coming from varying types of disciplines. The team therefore tends to be very heterogeneous and multidisciplinary in nature. It is obvious that before the submission of the offers and during the process of negotiating with the client organizations, there would be intense level of negotiations even amongst the individual members of the Consortium in order to arrive at acceptable levels of the offer and the level of concessions to offer during the negotiations with the public sector organizations. Added to this, as observed by Winham (1977) in his research on the outcome of the Kennedy Round of negotiations on the General Agreement on Trade and Tariff (GATT), is the fact that over time, negotiations to resolve complex issues accumulate settlement from the bottom up – a process generally referred to as building a package. The result is that negotiators monitor certain feedback variables, such as in the case of the consortium, the support from the various member firms for the outcome of the negotiations and thus their willingness to cooperate in the negotiated settlements.

Midgaard and Underdal (1977), in their study on multilateral negotiations suggested that one of the most fundamental consequences of increasing the number of actors is that the negotiation situation tends to become less lucid, more complex and therefore in some respects, more demanding. This is so because as number of participants increase, there would be more values, more interests and perceptions to be integrated or accommodated. What this means therefore is that each member of the team would have to consider more interests when deciding on his/her moves, as well as the fact that there are more moves and systems of interaction to be coordinated. They also argued that since there are more interests to consider, there would be more uncertainties as to the interests and motives of some of the other members of the team as to their perceptions of one's own utilities. This therefore led them to conclude that as membership of the negotiating team increases it becomes difficult for each member to decide on own moves and to find satisfactory

solution to the problems involved. This is because the heterogeneity in terms of interests and perceptions and more uncertainty within each party as to the preferences of the other, tends to inhibit the search for fair and integrative solutions, and cooperative and open negotiations become more difficult to attain. Uncertainty as to the exact preferences of others implies uncertainly as to which criteria should be met if a solution is to be satisfactory; and even if the criteria are clear, since interests are varied, the harder it is to generate solutions that satisfies them all. The result is that stalemates become likely features of the negotiations.

To resolve some of the problems associated with negotiation within heterogeneous teams, Midgaard and Underdal (1977) suggested a number of measures to adopt, one of which is through differentiation by which a leader or a mediator is appointed, since to them, powerlessness begins to develop as the team size is enlarged. It is in this respect that the role of a champion within the Consortium becomes vital. Another may be by way of joint measures through the formalization of rules and the introduction of special mechanism for resolving stalemates such as ensuring that once agreement is reached on an issue it not reopened by another party, implying there is commitment to the earlier negotiated terms. Other measures may include the formation of subgroups specifically assigned to examine particular issues and find solutions to them.

It must however be emphasized that, from a process perspective, the multidisciplinary nature of the Consortium means there will be more parties and thus more resources working on finding solutions. However, according to Midgaard and Underdal (1977), the extent to which this happens depends on the unity among members. Research by Underdal (1973) on negotiating behaviour of the EEC coalition, found that the pluralistic structure affected community decision-making capacity as well as the substance of the decisions arrived at. Thus a Consortium consisting of members whose positions are identical in advance may reduce complexity in their efforts in reaching agreement on issues. The danger therefore is that where there is no unity of purpose, coalitions or subgroups tend to develop within the Consortium which in turn engenders slow decision

making and disagreements. The result is that Consortium members become slow and inflexible in their actions and tends to develop passive approach to the negotiations.

### 3.3.8 Level of the first offer

Negotiations are as a result of conflict of interest. Conflict of interest between any two parties is referred to as the discrepancy between their preferences for the distribution of a scarce resource. The conflict is thus caused by different expected payoffs for the same outcome. Hence parties to a negotiation tend to become deadlocked when both are strongly motivated to achieve their most desired outcome under conditions that permit only one to be realized. During their experimental study on the effect of the level of conflict of interest on negotiation outcome, Druckman *et al.*, (1977) found that where each party has vested interests, the time it takes to negotiate and resolve the conflict is usually longer. They also found that at the end of the day there were more unresolved issues among the parties with higher vested interests. Negotiators in the high-conflict-of-interest conditions view the conflict as more of win-lose competitions and are therefore less willing to compromise and feel dissatisfied with the outcome of the negotiations. They also found the negotiating atmosphere as more hostile and more futile.

On the other hand those under low-conflict-of–interest conditions view the outcome of the negotiations as more positive, the process as more rational, cooperative, friendly and productive. These finding were also corroborated by Hammer & Yukl, (1977) after extensively reviewing various researches on negotiating strategies and came to the conclusion that the probability of a settlement was greater when the opponent adopts a soft- or intermediate-offer strategy rather than a hard-offer strategy where the opponent sets a high initial offer level and make very little concessions. Walton and McKersie (1965), also argue that just as an opponent may resent the extreme early-firm-commitment strategy which is essentially a final-offer-first approach, s/he may also react adversely to an initial position which is extremely ambitious and bears no relationship to a reasonable settlement.

The level of the first offer proposed by the Consortium coupled with the expectation of the public sector organization in term of the Public Sector Comparator, will determine the extent of the bargaining arena. The public sector comparator is calculated by computing what it would have cost the public sector if the project were procured using the traditional route including the operation of the infrastructure over the concession period. Where there is a yawning gap between the initial offer and the public sector comparator, the bargaining process will tend to be long and arduous. The level of gap between the Consortium's offer and the public sector comparator is heavily influenced by the ability of the private sector Consortium to understand what the public sector wants.

Ting-Toomey and Kurogi (1988), in their works on face-negotiation theory stated that face influences conflict behaviour because the parties to a conflict tend to consider protecting self-interest conflict goals. According to Brown (1977), some of the most troublesome problems that arise during negotiation are the intangible issues related to loss of face. He found out that in some instances, protecting against the loss of face becomes so central an issue that it literally swamps the importance of the tangible issues at stake and generates intense conflict that can impede progress towards reaching an agreement and thus increases substantially the cost of resolving the conflict. To him, such issues may arise in general as spin-offs of one or more of the tangible issues in the dispute, and/or as a result of certain situational factors. Citing the empirical evidence from the works of Brown and Garland (1976), threats to face may be experienced when one is exposed to another who among other things, makes bids or proposals that reflect excessive interest and refuses to make reasonable concessions, or worst still makes negative concessions. The level of the first offer as reflected by the *tariffs* proposed by the Consortium could thus become an element of threat to the public sector procurer where these tariffs appear to rather excessive relative to the public sector comparator. Considered in the light of the fact that the public sector organizations are highly sensitive to public accountability, any excessive elements of profits whether real or disguised in the level of *tariff/shadow toll* proposed by the private sector is likely to aggravate the threat to face within the public sector organization.

According to Tadesci and Bonoma (1977), where goals are incompatible and seen to be vital to the individual parties, this may breed suspicion regarding motives and trustworthiness and reduces the effectiveness of positive modes of influence such as promises, persuasions, or moral exhortations during negotiations. The result is that each party begins to resort to threats in order to force compliance and parties begin to view themselves as defending themselves against the intrusion of the other. What then happens during such negotiations is a spiral of counter-productive arguments and prolonged negotiations. The public sector negotiators could regard a rather high level of the first-offer as an indication on the part of the private sector to be exploitative and thus induce the above form of reaction from the public sector negotiators.

Other elements of the offer which may or may not reflect the amount of altruistic predisposition of the Consortium to the Public Sector client may include the level of financial guarantees required of the client, and the payment mechanisms proposed. Added to these are the technical elements of the proposals as to level of clarity, innovativeness and robustness.

## 3.4 The Public Sector Procurer

Public sector organizations, like any other institutions tend to operate within cultures of their own which evolve over time. The concept of organizational culture as conceptualized by Hofstede (1991) could be described as being *holistic* in the sense that it refers to a whole which is more that the sum of its parts; and *historically determined* which refers to the history of the organization. It could also be related to what anthropologists may refer as a rituals and symbols. It is created and preserved by the group of people who together form the organization, i.e. *socially constructed* and therefore soft and difficult to change. Hofstede's research at the Institute for Research on Intercultural Cooperation (IRIC) provided six dimensional variables to organizational culture. These dimensions are process vs. result oriented, employee vs. job oriented, parochial vs. professional, open vs. closed system, lose control vs. tight control and finally normative vs. pragmatic. All these forms of cultural orientation within an

organization tend to reflect in the way the individual working in such an organization views things and handles issues.

Within a process-oriented organizational culture, people perceive themselves as avoiding risks and only making a limited effort in their jobs, whereas in a results-oriented organization people perceive themselves as comfortable in unfamiliar situations and put in maximum effort, perceiving each day as bringing in new challenges. People in loose control units feel that no one thinks of cost, meeting times are only kept approximately, whereas those in tight control units describe their work environment as cost conscious, meeting times are kept punctually. For closed systems, the organization and its members are considered as secretive in their dealings with both the outside world and even among its on members. In the same vein, pragmatic institutions are market driven while normative ones perceive their tasks toward the outside world as the implementation of inviolable rules by correctly following organizational procedures which are more important than results. The IRIC research found out that privately owned organizations are more pragmatic while public institutions tend to be more normative.

Some of the key organizational attributes including the technical and financial ones of the public sector procurer identified in literature and through the interviews and public forums that have significant influence on the PPP pre-contract procurement processes up to financial close are further elaborated on within this section.

### 3.4.1 Top-level commitment

The support of a power holder is indispensable in every organization, especially in decisions that are novel. Such persons preferably should have charisma and not pure administrators (Hofstede, 1991). S/he will not only play crucial roles in ensuring that the right expertise and other resources are available to undertake the project including negotiating with the private sector, but would also make a conscious effort of realizing his/her crucial and lasting role in the process towards achieving the desired goals. One of the effective tools usually deployed during negotiations is that of referent power where a party refers to a higher status authority in order to obtain compliance from the other party

(McCall & Warrington, 1989). Support from the top level management to the negotiating team is therefore vital in concluding deals timely, especially where the private sector party believes in the authority and commitment of the public sector top level management's commitment to outcome of the negotiations. In negotiation, high status contributes to the believability of a source's communication.

### 3.4.2 Level of Institutional bureaucracy

Though the negotiating literature strongly suggests that personality traits play an important role in influencing the conduct and outcome of negotiations, negotiators are also role-incumbents whose performance are evaluated by well-defined constituencies. In this respect, they are held accountable to these constituencies for the outcome of the negotiations. This is particularly the case when the negotiations are being monitored. Every public sector institution is accountable for the use of the public purse and as a result various bureaucratic structures are put in place to make this happen. These forces begin to moderate the natural personal traits of the individual negotiators most especially where the checks are very severe. The implication of this is that negotiators, in an attempt to save face before their superiors by appearing as hard bargainers, may create costly deadlocks during the negotiations.

According to Brown (1977), for negotiators to be effective, they must normally be firm without appearing too rigid, and at the same time they must be willing to yield without appearing too conciliatory. To him, by being too firm and creating an impression of rigidity, a negotiator may

i) forgo timely opportunities to clinch a good and early deal,

ii) cause the opposing party to become exceeding tough and resistant, and

iii) cause oneself to be seen as unfair or unwilling to negotiate in good faith.

However, during instances where the negotiator appears to be too conciliatory and yielding too readily, s/he risks creating a situation of being seen as overly anxious to reach an agreement, or cause oneself to be seen as willing to settle for less than might

otherwise be expected to seek. This may allow the opposing party to exploit the situation to his/her advantage.

### 3.4.3 Attitude to cost

When setting realistic goals and making concessions during negotiations, the ideal of integrative bargaining is served best where each bargainer is able to clearly distinguish between issues of greater and lesser importance. This allows him/her to adopt a strategy of holding firm on high priority issues while conceding on the low priority ones. This approach encourages the development of trade-offs and valid information exchange. Within the traditional form of procurement where the lowest bidder takes the project, public sector organizations have naturally developed the attitude of considering price as the predominant determining factor in deciding who wins a contract. This attitude to cost if carried over to the PPP negotiation table may have effect on the trade-off necessary in order to secure early agreements. The PPP procurement requires of bidders to provide innovative design alternatives that meet the public sector service requirements expressed in the form of output specifications. In this respect, price is obviously not the only requirement in assessing a successful bid. It is therefore important that explicit consciousness-raising among the public sector organizations that intend to undertake projects using the PPP be emphasized for them to clearly understand the basic differences between the modalities for procuring projects using the traditional approach and those using the PPP concept.

A piece of research conducted by Pruit and Lewis (1977) indicated that integrative agreements during negotiations are more likely to emerge where bargainers demonstrate what they called *flexible rigidity* in their behaviour – while remaining relatively rigid with respect to their ends (goals and aspirations), they must be flexible with respect to means by trying out various options in search for one that satisfies both sides. Integrative bargaining is a process by which negotiators seek to maximize joint utility, often through finding non-obvious solutions to their common problems.

### 3.4.4 Technical Strength

Bargaining only occurs in situations where each of the parties believes s/he can gain something from making an agreement. Where one of the parties believes s/he is much more powerful than the other, s/he or he may try to coerce the weaker party into giving up resources without receiving any in return. It is therefore necessary that the parties to a bargaining table should not be too asymmetrical in power. An established social/psychological principle is that an expert is superior to a non-expert in gaining conformity to his/her persuasive communications, in that expertise enhances the effectiveness of warning and communication, since a source's reputation in expertise apparently leads others to assume that his/her credibility is high (Tadesci and Bonoma, 1977). It is for this reason that the public sector organizations engaged in negotiating with the private sector Consortium be equally competent and powerful in all the relevant disciplines to be able to withstand the might of Consortium which may be made up of a group of companies who in themselves are already individually powerful in terms of the human and technical resources they command.

One of the key attributes that emerged from the interviews is that the public sector organization should have within its set-up a strong in-house expertise in infrastructure procurement that is able to understand the private sector's technical, financial and innovative approaches proposed in their offers in order to be able to effectively negotiate those areas that can meet their requirements. Strength also comes from experience, and experience is only gained through having been exposed to situations of similar nature. Previous experience of the public sector organization and its staff in general infrastructure procurement provide both the organization and its staff the necessary ability to deal with issues relevant to a successful negotiation.

Again, the level of experience will reflect in the quality of the preparatory work done by the public sector organization before inviting tenders. The experience level of the organization and its staff will influence their ability to effectively establish the project parameters in the form of output specifications. Additionally, their ability to establish clear and concise statements of the evaluation criteria will guide the negotiation team in

arriving at an early decision on the optimal offer and what to consider during the negotiations. An informed public sector procurer who understands what is needed and who has sufficient expertise to communicate them is an obvious asset in obtaining value for money and timely processing of the various procurement stages.

According to Tedesci and Bonoma (1977), where parties to a negotiation are both equal in their relative strengths, coercion and escalation of conflict become counter-productive for both sides since each side will adopt retaliatory measures when the other tries to push things unnecessarily down the throat of the other. What then happens is that norm-formation and rule-setting may occur as protective measures, as each participant agrees to give up his/her usual damaging capabilities and rather focus on the issues that can help both sides to gain from the relationship. The result is that there is a more win-win attitude towards the negotiations. Such norms, some of which include equity, reciprocity and equality, help to ease difficulties of reaching solutions to the bargaining.

It is therefore not surprising that in the Gershon report which culminated in the establishment of the Office of Government Commerce (OGC) in April 2000 on how best to improve efficiency in procurement within the public sector and obtain value for money, there was a strong emphasis on the training of public sector procurement staff and providing them with the necessary incentives to have them retained within the public sector organizations. Among the number of recommendations contained in that report for which time scales were set, included a professional Government Procurement Service to cover designated procurement staff in all departments and agencies; by 2000, seventy five percent (70%) of the members of the Government Procurement Service in key designated posts should have or be working towards a graduate level procurement qualification (HM Treasury, 1998). This is quite an important recommendation because earlier research indicated that the private sector was more ready to employ highly skilled and experience professionals to handle the tendering and negotiation processes of their PPP/PFI projects than the public sector infrastructure procurement organizations (Ahadzi & Bowles, 2001a)

Other recommendations contained in the Gershon report included Government departments emphasizing procurement as a core skill in non-procurement training programmes for managers; the Civil Service College, in consultation with departments, to offer enhanced training of fast-stream graduate entrants; and that departments deploying non-procurement staff to manage contracts to ensure they receive specific procurement training beforehand. The report also recommended strong collaboration between departments in order to tap knowledge and expertise gained by others. The then Scottish Office (now the Scottish Executive) did consult extensively with the Highway Agency in developing the PPP/PFI project for the development and maintenance of the A74(M)/M74 Design-Build-Finance-Operate (DBFO) road project linking Scotland with England (Ahadzi & Bowles, 2001b).

The above are quite important recommendations that need to be implemented if the power balance is not to be tilted heavily in favour of the private sector Consortium during the negotiation of the PPP projects. In fact, in a report to the House of Commons Select Committee on the implementation of the PPP/PFI concept, W.S. Atkins (1996), for instance noted that within those organizations that have been involved most frequently with project procurement such as the Department of Transport, the level of efficiency in handling the process has been greater, whereas those less familiar with project promoted appeared less comfortable with the process. Though these inadequacies are often made up for by engaging external consultants, it imperative to note that managing these consultants effectively enhances the chances of not only obtaining a good deal but also in pushing the process forward in a timely manner. Research conducted by Anderson *et al,* (2001) on the means of optimizing client/contractor core competencies for major infrastructure projects identified that the use of in-house resources may not only be more cost effective in areas where their competency levels are high but also that the client organization may be in a better position to obtain higher quality products at the end of the day.

### 3.4.5 Documentation

According to Brehmer and Hammond (1977), disagreements are never easy to resolve and successful negotiations are difficult to achieve, not only because the judgment tasks are complex, but because judgments are produced by a poorly understood process, since they are not always the product of an explicit and fully analytical procedure that is easily retraceable. To them, human judgment is characterized by a mixture of analysis, intuition and experience; a process which can be very uncertain at times, relying on different information at different times – a condition that can induce prolonged disagreements and frustrate negotiations. Citing the works of Summer *et al.* (1969), Balke *et al.* (1973), they indicate that a general finding of studies of human judgment is that the subjects studied are seldom able to describe consistently, accurately and completely how they arrive at their judgment. The very fact that introspective description of decisions within negotiations are likely to be incomplete and inaccurate because of human inability to be precise, a third person may likely attribute any inconsistencies, inaccuracies and incompleteness to an intention to be devious and assign evil intent on the part of the negotiators.

The respective central and local institutions responsible for the propagation of the PPP such as the Treasury Task Force (now Partnerships UK), the Office of Government Commerce, have recognized the above weakness in human behaviour and have therefore made attempts to disseminate information as much as possible in the form of guidelines and reviews of major projects. Some of these guides now include the development of standard bidding documents to aid the process towards the realization of the project objectives. The Scottish Executive, for example, has developed standard contract documents for the implementation of PPP school projects . In a similar vein, the Office of Government Commerce has also produced similar standards.

Every negotiating team requires factual information and specialist advice coupled with management decisions. Hence there is the need for the necessary back-up data to be assembled to enable answers to be given to each question to be foreseen as coming form the other party. These could be related to the technical submissions and/or the

commercial aspects of the bid proposed by the Special Purpose Vehicle (SPV). The quality of the information provided by the public sector procurer has a tremendous effect on the quality of the proposals submitted by the bidder. Clear and precise output specifications should generally enhance the quality of the bids and that should enable early resolution of any gray areas during the negotiations.

One of the difficulties in negotiation is to ensure that the two sides have identical understanding of what is being discussed. Differences in terminology, the use of words which are terms of the art to one side but not to the other, and differences in language especially in international contract negotiations, all contribute to misunderstanding during negotiations. It is therefore important that at the time the two sides meet at the bargaining table they both have identical understanding of the terms to which they are agreeing. Expert knowledge in the areas that have to be negotiated upon and knowledge about the opponent's aspirations and circumstances are thus essential in pushing forward the negotiation process (Kennedy *et al*, 1987). Since both parties to the negotiation operate against a background of urgency they are generally ready to accept the principles of standard conditions to avoid negotiation of specific terms for each transaction. When they know that every contract will be regulated by known conditions, they can apply themselves to negotiating what they view as important, such as the output specifications, delivery, the tariffs, and the service level.

A tender document and the resulting tender or offer therefore attempt to fulfill the above requirements by covering such areas as guarantees on performance, limitations of liability, settlement arrangements in respect of disputes, and other contingencies. During major infrastructural procurement where complex transactions are negotiated and involving large and powerful buyers such as the Highway Agency, these organizations have developed their own conditions of procurement. This is because there will be perceived lack of control if supplier's own terms were to be used or if all items had to be negotiated in each instance. At the start of the PPP/PFI programme in the early 1990s the idea was to make the process a 'deal-making' arrangement. The result was protracted negotiations and in some instances abortive procurement processes.

### 3.4.6 Financial strength and support from the central government

The negotiating literature clearly recognizes that *who* the source of influence is, *what* s/he is like, the *resources* s/he possesses, the scope of his/her *legitimate* authority, all affect the believability of what s/he communicates to the other negotiating party including the believability of even threats issued by him in the event of the other party not responding positively to his/her concessions. Perceived trustworthiness, control over resources and legitimate authority are therefore characteristics that influence the way a target responds to influence attempts (Tadesci and Bonoma, 1977).

The fact that a local government agency that is able to receive financial support /guarantees from the central government to undertake such massive projects as envisaged under the PPP should send signals to prospective private sector consortia that the agency has the strong banking of the central government. This would therefore increase the comfort zones of the Consortium and reduce some of the perceived risks. Some PPP schemes especially those that derive their revenue via shadow tolls/tariffs rather than through tariffs and tolls directly charged on the end-users require alternatives to be put in place for the end-user to have the option of choice. This will mean the public sector procuring organization will have to provide funds to put in place these alternatives. In other instances, certain facilities are required to be provided under the contract by the public sector procurer such as reliable access roads to the toll road. Any meaningful support from central government to the local authority undertaking PPP project of this nature will send a strong signal to the private sector bidders as to not only the financial support accorded the project from the center but also the political support it enjoys.

The ability of the public sector organization to offer tax concession and flexible tax regimes is not only an indication of its capabilities but also a demonstration of legitimacy in the eyes of the private sector. One of the difficulties faced by some of the local government agencies in undertaking the early PPP programme was that of ultra-vires issues. A number of those public sector departments and agencies that did not have the appropriate legal authority to negotiate and enter into contract of the PPP types were

bogged down with legal tussles that ended in prolonging the process towards reaching early agreement

In the same vein any agency that is able to partially support projects by raising funds through bonds raises its credibility level in the eyes of the prospective bidders and therefore has an added clout in negotiating terms on equal footing with the private sector. This financial capability is an indication of the possession of an abundance of relevant resources that go to enhance the believability of the party and contributes to the success of the negotiations. In November 1997 for example, Paribas raised bond finance in the sum of £88 million for a PPP project where the borrower was a local authority heralding the introduction of long-term cost effective financing of PPP projects (Akintoye *et al* 2001).

According to Akintoye *et al* (2001), bonds come in two main forms – publicly issued bonds or privately placed bonds. The privately placed ones are those bought by large financial institutions. Publicly placed bonds are generally of two types – Monoline or Credit Enhanced Bonds where for instance insurance companies guarantee the bonds and the payment of the principal and interests. Hence the risk of project default is removed from the ultimate purchasers of these bonds, thus giving comfort to the investor in the bond. The other type is the Non-enhanced Bond where in the event of project collapse, the purchaser or investor in the bond takes a direct hit.

Equity generally represents a small proportion of funding for major PPP/PFI projects. They are generally in the region of 5-20% of the funding requirements. The provision of equity is an indication of the provider's strong interest and faith in the project. To arouse private sector interest in a particular project, the public sector client may want to demonstrate this through the provision of some form of equity funding towards the project.

The concept of revenue dependent project is structured around two major means of obtaining the revenue – those that are chargeable on user-fee basis in the form of tools and tariffs and those that are based on shadow tolls where the public sector organization

pays for the services provided under the scheme. The UK model principally operates the shadow toll approach. The capability of the public sector to pay the shadow tolls proposed in the bids is an indication of the its financial strength and this should naturally reflect in their approach and behaviour during the negotiations. It should also give an indication to the private sector that they are dealing with a powerful institution that can force compliance and would therefore be much more ready to reciprocate concessionary moves by the public sector client and thus speed up the process towards a negotiated settlement of the issues that may arise during the bargaining.

## 3.5 The Project

A principal behaviour observed in large-scale negotiations is the process of adapting to the complex environment created by the demands and offers of each negotiating party. Negotiators tend to proceed towards agreement by first tabling a position that is exploratory at best, because at this stage, the negotiating teams scarcely have an idea of what a final acceptable agreement would look like for a number of reasons one of which has been identified as the fact that serious thought seem to be given to what is acceptable only after the negotiation has begun. The second reason is that what is acceptable is a function of what is available, and this is demonstrated during the act of negotiating (Winham, 1977). The process therefore involves both parties incrementally exploring the interface between the bargaining positions of the other party. In so doing they will be carefully examining what is at stake, the value they can derive from it as the negotiation progresses. At the core of the PPP negotiation therefore is the project and its characteristic attributes in relation to its nature, complexity and the inherent value it commands. This section therefore reviews PPP projects in terms of nature and complexity including the inherent values in terms of marketability and how these characteristic elements may influence the outcome of the negotiation process.

### 3.5.1 Project size and complexity

Project complexity tends to increase the number of issues and viewpoints that must be accommodated in the negotiation process. These issues are complex in themselves and

important aspects of them may be misunderstood because information is inadequate and the cost of improving it is high due to the very fact that some of these issues may be unknown at the start of the negotiations or at the planning stages of the project. As a result, the style and content of negotiators' behaviour in these complex issue areas are affected by these complexities of the issues at stake. Research in the area of decision-making, documents findings that decision-making in complex situations differ from those involving cases of clear-cut and unambiguous issues and alternatives (Cyert and March, 1963). This evidence has also been documented in construction management literature where for example, Diekmann and Girard (1995), in there research into developing Dispute Potential Index for construction projects came to the conclusion that though large and complex projects, in terms of complexity in both design and constructions, tend to have inherently higher levels of disputes during there implementation, it is people who either greatly help or hinder the progress of settling disputes on projects – a confirmation of the assertion that the style and behaviour of actors in these situations is influenced by the complexity of the situation.

Under complex negotiations, the mastery of materials become a problem and therefore involves a great effort to gather, maintain and process information needed to make intelligent and strategic decisions - a situation observed by Winham (1977) in his research on the multinational negotiations relating to the General Agreement on Trade and Tariff. An element introduced by complexity in the negotiation is the problem of not having any firm guidelines with which to evaluate agreements and thus leaves the parties to the negotiating table in the difficult position of having to negotiate over the measures to be used as well. Complication therefore tends to inhibit rational choice and value maximization. Complexity therefore tends to challenge negotiator's comprehension due to in part to information overload, and to uncertainty that creates the problem of discovery or generation of information. Citing the research works of Druckman, (1973), Winham, (1977), suggests that complexity affects negotiators' perception of the situation and thus presumably affects their expectation and negotiating behaviour as well; and that complexity affects a negotiator's ability to understand an opponent's strategy.

Walton and McKersie (1965), in their study into labour negotiations, also came to the conclusion that complexity of a decision situation increases the ambiguity of information available to negotiators and makes it subject to more varying interpretations. They however found that where information was made more succinct and the issues were made clearer, the negotiations progressed to a more success end. In the negotiating literature therefore, complexity is an important factor in understanding a negotiator's behaviour during bargaining and hence the outcome of the negotiations in terms of how long it takes to come to an agreement. In order to make the PPP projects financially attractive to investors, client organizations tend to package them in typically large chunks not only in terms of contract values but also in terms of numbers of packages. For example a PPP schools projects could be packaged as an aggregation of up to five existing schools to be rehabilitated and a couple of new schools to be built such as The Edinburgh Schools Partnership Project.

### 3.5.2 Novelty in Project

One of the underlying philosophies of the PPP procurement strategy is to tap private sector innovation not only in the management of resources but also in the design of the projects. In the same vein, the private sector consortium would like to produce designs that are innovative enough by making use of current state of the art in order to minimize cost and optimize their profit levels. However, as can be gleaned from the literature on negotiation theory, not only does novelty inherently creates information problem, but perception of situations are likely to be dissimilar (Walton and McKersie, 1965). The PPP in itself is by and large a novel concept to most of the public and private sector organizations because over the past three decades or more, the traditional form of procurement had dominated the landscape of public infrastructure procurement where rules for the choice of the winning bid are clearly laid out, in the form of the lowest bid. The result is that there have not been rigorous levels of negotiation involved in the process at all and hence lack of past experience in the processes of negotiations. Added to the general lack of experience in contract negotiations, novelty in both the design and the process as a whole would create uncertainty in the minds of both parties and thus affect the negotiation process.

Again, since lender will be relying on the project to service their loans, they will insist that the total cost of the project be determined at the outset. They, including other investors, must have the confidence that the project can be built at the cost initially estimated and be operated within the funds being committed. The result is that proven technology will normally be required since experimental or state-of-the-art technology would add to the risk of the project and make funding difficult to obtain. The result is that the less predictable the total cost, the more lenders will insist on stand-by commitments from the consortium and/or from the public sector institution (UNIDO, 1996). According to Leiringer (2001), banks and financial institutions tend to be generally risk-averse when it comes to project financing. To him, they are known to be particularly cautious when new techniques and procedures are proposed and that the technical competence of their staffs with respect to the assessment of innovative infrastructure projects, can at times be lacking, and that this limited ability to evaluate proposed solutions impedes the amount on new thinking that can be exploited by the private sector Consortium.

## 3.6 The External Environment

It is important to recognize that the physical, social, political and economic environment shapes the potentials within any human venture in a profound manner, because people and organizations operate within this larger environment of which they are individually only one part or component. It is therefore necessary to understand the relationships and the interdependencies between the parts before one can predict or understand the behaviour of one or more components. It is in this light that the elements relating to the external environment are being identified in this part of the research in order to analyze the extent of their influence on the pre-contract negotiation phase of the PPP procurement.

### 3.6.1 Availability of traditional projects

A major variable that structures interorganizational relationships such as those envisaged under the PPP philosophy is *dependency*. According to Stern *et al.* (1977), what dependency means is that two or more organizations must take each other into account if

they are to accomplish their goals. To them, dependence of party A upon party B is (a) directly proportional to A's motivational investment in goal mediated by B and (b) inversely proportional to the availability of the goals to A outside of the A-B relation. They cited Schmidt and Kochan, (1972) who posited that a relatively high level of mutual interdependence induces the parties to seek further the relationship and thus seek to invest in mediational mechanisms for the containment or management of conflict. In an environment where there are sufficient traditional projects, contractors may not feel the urge to come together to undertake projects through the PPP strategy, the process of which they may find daunting and expensive to pursue by avoiding to delve into the unknown.

An essential element for any meaningful negotiation that induces the reaching of early agreement is that of power possessed by both parties – an element that could be used intelligently as a subtle form of threat to induce compliance (Tadesci and Bonoma, 1977). Within an economic environment where there are only limited numbers of traditional projects and the level of competition among the respective bidders for the PPP project is keen, the public sector employer's hand may be strengthened by his ability to keep the second lowest bidder as a reserve bidder. This can act as a subtle form of pressure to induce the lowest bidder to concede on issues being negotiated in a manner that can benefit the client and the process in general. This approach to the negotiation could act as powerful indicators of intentions to call the lowest bidder's bluff and invite the second lowest in – an indication of resoluteness on the part of the public sector procurer. This will not only act as a deterrence to the lowest bidder to unnecessarily prolong the negotiations but will induce better value for money as competitors will endeavour to put in their utmost and most innovative bids. Worthy of note however is the findings of Druckman (1973) and Rubin and Brown (1975) about the effect of time pressure during bargaining. They indicated that though a moderate time pressure when applied to both bargainers in the form of deadlines or penalties promotes reaching agreement and making the concessions necessary to do so, it also has the unfortunate effect of worsening the individual outcomes of the bargainers than for bargainers not under pressure. Hence there should be careful balancing art here in the use of the second lowest bidder as a bait to

induce early negotiated settlement as both sides may end up being worse-off, most especially for the public sector in obtaining value for money. In fact, where one party feels aggrieved, the likelihood is that negotiations will reopen no sooner than the project is underway. The World Bank for example reported that most concession contracts are renegotiated on average only after 2.1 years of signing the contracts, with some degenerating into expensive legal battles over payment and contractual terms (Bell, 2003). Naquin (2003) refers to this kind of situation in negotiations as *counter-factual thinking* on the part of the parties where each parties goes home feeling s/he could have got a better deal from the negotiations if s/he had pushed a little further with his/her case.

### 3.6.2 Strong public-private sector relationships

This sort of relationship may be viewed at two levels. The first level may be that of the macro level relationship such as the general public sector's attitude and perceptions towards the private sector and at the micro level, which relates to the relationship between individual public sector organization and the private sector firms involved in the PPP procurement.

Taken at the macro level, one of the main objectives of the PPP is to bring the private sector directly into the provision of services, with the public sector acting as an enabler and where appropriate guardian of the interests of the users and customers of the public services. This would evoke the exploitation of the full range of private sector management, commercial and creative skills. This, it is hoped, would promote efficiency, improve services and stimulate fresh flows of investment and bring into operation a whole range of activities and services traditionally regarded as the exclusive domain of the public sector.

Yates & Mukherjee (1993) noted that the changing political situation world-wide has fostered an emerging desire to create long term financial commitments and presence in foreign countries in the form of build-own-transfer and privatization projects. At the same time the forces of global economic competition has forced a rethinking of national strategies to reduce the burden on the central government and taxpayers without denying

any services. Hence there is an increasing global trend towards reduced government involvement in the provision of basic services, and one reason cited for this trend is the natural consequences of monopoly systems that create inefficiencies. He also indicated that government involvement in national economics is steadily decreasing, through deregulation, the sale of government-owned assets, and privatization - a trend that holds true for both developed and developing countries.

Governments are therefore now focusing on the creation of the enabling environment that will promote the growth of the private sector and their full participation in the rebuilding of their countries' infrastructure. The challenge for the transition to a private sector-led economy is to transform the public sector into an instrument that promotes private sector-led development by enhancing the efficiency and responsiveness of the public sector institutions through capacity building and the acceleration of the privatization process.

Complicated bureaucratic procedures and the lack of administrative decisions are often cited as major obstacles. Hence the private sector and lenders tend to carefully evaluate the organization, their experience and procedures of the procuring administrative entity critically to test their preparedness to understand the private sector's culture before deciding to participate in such projects. At the institutional level, most governments have appointed an internal focal point to formulate and co-ordinate the government's policy on privately financed projects. Examples are the Water & Power Department in Pakistan, the Ministry of Public Works in Chile, the Ministry of Finance in Argentina, the State Planning Commission of China, and the Office of the Prime Minister in Malaysia. In other countries, such as the Philippines and Sri Lanka, the governments have established high-level intergovernmental committees as the institutional focal point to formulate and administer privately financed project policy (UNIDO, 1996). Here in the UK, Partnerships UK (formerly known as the Treasury Taskforce or the Private Finance Panel), of the HM Treasury is the focal point of policy formulation and dissemination.

In the same vein, public sector agencies that interact with the private sector need to consider entrepreneurs as clients with needs and preferences as well as with views that

must be taken into account. The relationship between the public and private sectors may also be expressed in the types of general business legislation that exist in the system. A country's business legislation may have an impact on the implementation of a PPP project. Legislations such as those covering property rights, enforcement of contract rights, and protection of intellectual property, corporate laws and other legal avenues to promote private participation within an economy, are indicators of the level of the public acceptance of the involvement of the private sector within the economy.

At the micro level, a well-established existing relationship developed between the public sector institution and private sector contracting institutions, may make a substantial difference in the way the negotiations are conducted. This level of relationship is what is referred to in the negotiation literature as *intensity* which represents the degree of involvement demanded of the parties. This may be measured by the size of the resource investment and the frequency of interaction. According to Stern *et al.* (1977), where the resource investment and/or the frequency of interaction are high, the intensity of a relationship has a positive effect on its persistence. To them, organizations in an intense relationship realize the ongoing contingencies that their actions will create for each other. As a result, they will strive to arrive at mutual solutions. This may be the situation with frequent and big time buyers of contractors' services such as the Highway Agency and the National Health Services (NHS).

### 3.6.3 Public acceptability of the PPP philosophy

The negotiation literature vividly demonstrates that constituents or their subgroups can create conditions that threaten a representatives' face during negotiations. According to Brown (1977), various public institutions and individuals not directly involved in the negotiation may provide the impetus for the negotiator to save face. There are those other referents that may seen non-personal but can be vaguely defined in the negotiators mind and have an influence on the way s/he approaches the negotiations. Such institutions as the media, pressure groups fall into this category.

PPP projects, because of the fact that they reside in the public domain, tend to attract a lot of public attention. The stakeholders are many and are varied and therefore interests

groups are very diverse. A number of major projects have been known to be disrupted as a result of protester attacks. According to the NAO (2001), the security costs of £25m to prevent disruption from protesters during the construction of the £105m Newbury Bypass linking the Midlands to the south coast constructed between 1996-1998, accounted for the £35 cost overrun on the project.

## 3.7 The preliminary generic model

On the basis of the literature review and information gathered during interviews, the underlying dimensions of the generic model are represented in Figure 3.5 below.

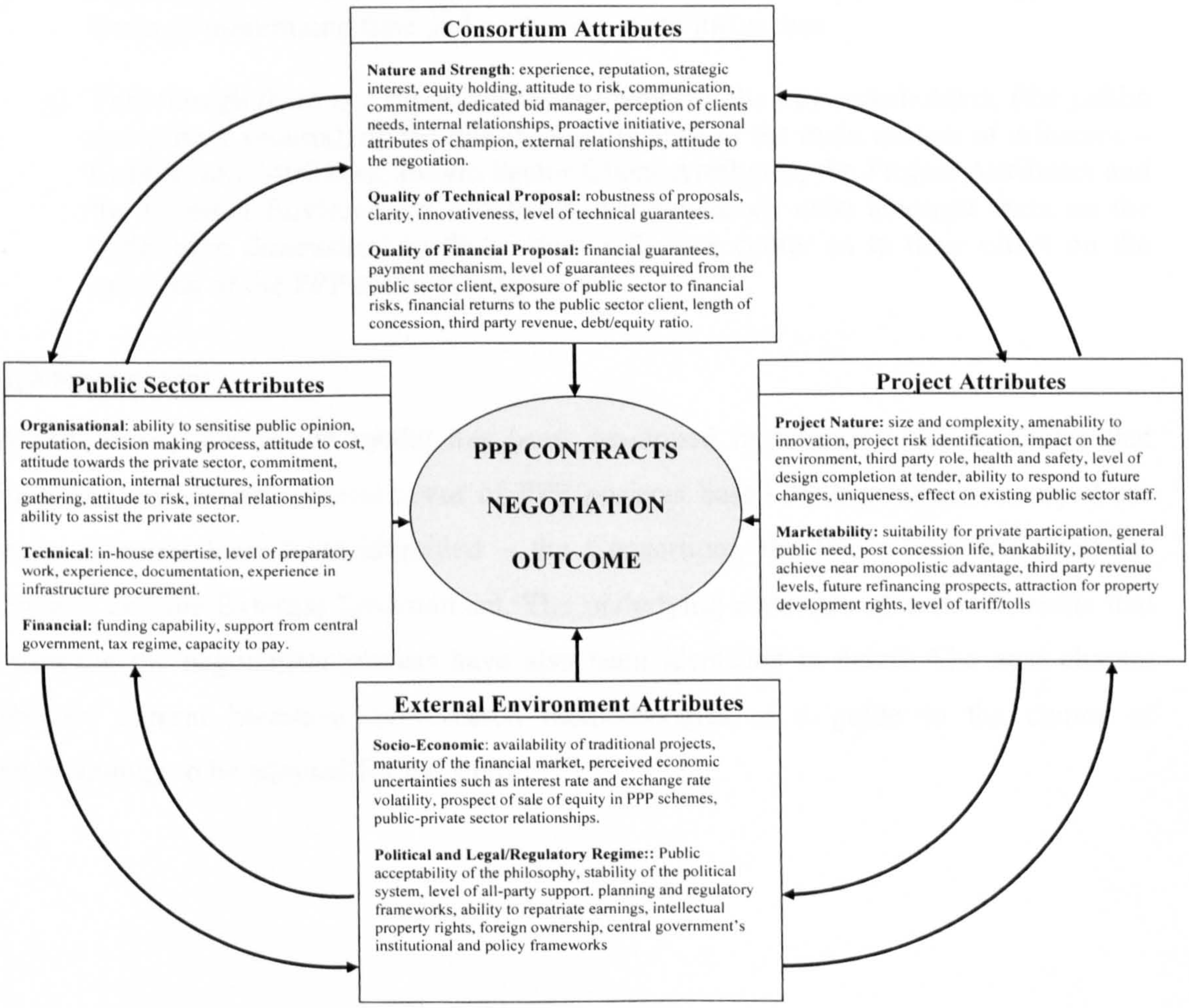



**Figure 3.5 PPP & Contract Negotiations: Dimensions of the Generic Model**

## 3.8 The Research Hypothesis

On the basis of the objectives and scope of this study, the following hypotheses have therefore been proposed for testing and validation:

a) The twin problems of pre-contract time and cost overruns are real in the PPP infrastructure procurement and therefore remain a serious issue to be addressed if the philosophy is to gain general acceptance among all stakeholders.

b) That a generic model can be developed that will capture in a hierarchical order of significance the key attributes that positively influence the efficient and effective implementation of the negotiations phase of the PPP procurement process in terms of minimizing time and cost overruns to the parties.

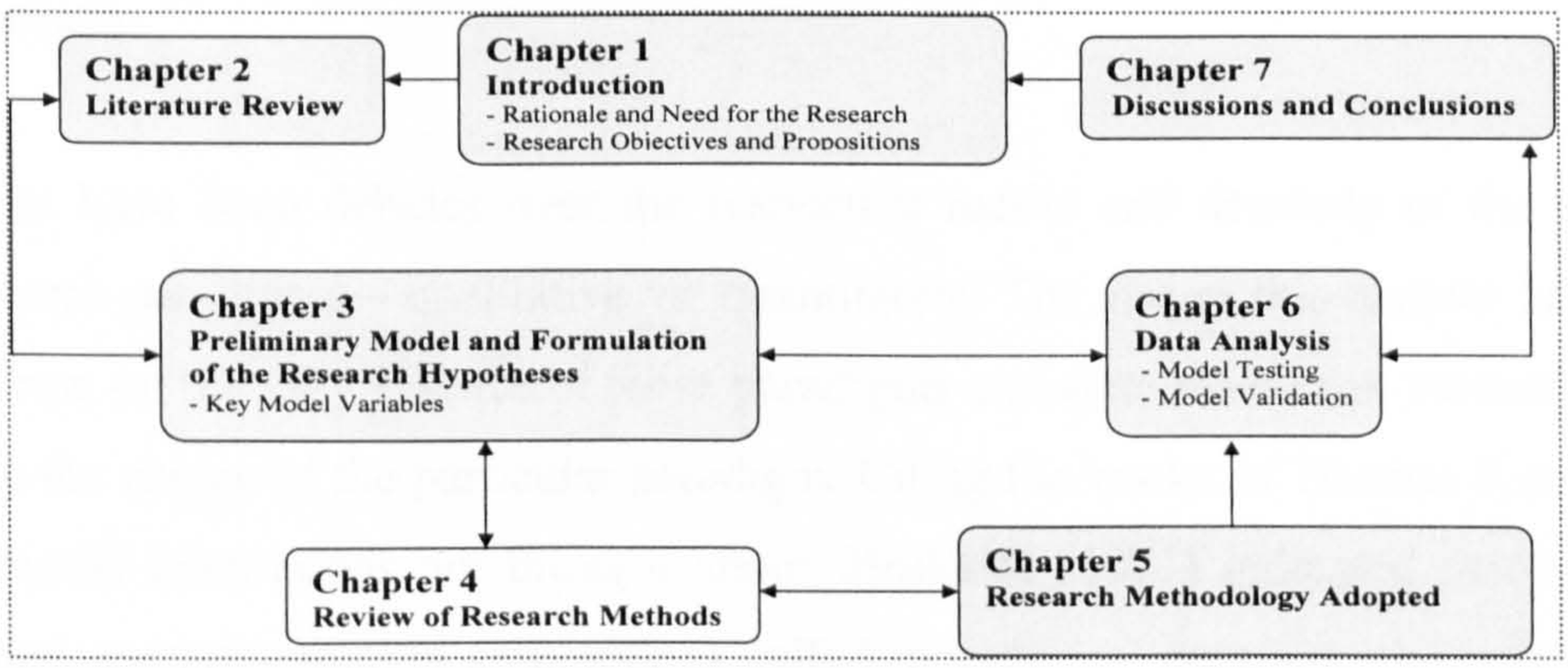
c) That though there is a broad agreement between the key stakeholders, (the public and private sectors), on the relative significance of the main centers of influence – Consortium Attributes, Public Sector Client Attributes, the Project Attributes and the External Environment Attributes, differences do exist amongst them on the underlying dimensions to these main influence center as to their effect on the outcome of the PPP contract negotiations.

## 3.9 Summary

A preliminary contextual model has been developed highlighting key attributes that influence the efficient procurement of PPP projects based on negotiation theory. Four main elements have been identified – the Consortium, the Public Sector Client, the Project, and the External Environment. The underlying attributes of these elements that influence the negotiation process have also been identified in detail. The next chapter reviews current literature on research methodologies as a guide to the choice of methodology to be adopted for the study.

# Chapter 4: Review of Research Methodologies





# Chapter 4: Review of Research Methodologies

## 4.1 Introduction

In order to avoid any likely problems and difficulties relating any piece of research, adequate steps need be taken to guide the research process from start to finish. A number of steps are therefore needed to guide the research strategy. These must include an understanding of the fundamental issues likely to affect the investigation and measures to overcome them; an understanding of research typologies and justification for their selection; and last but not the least, a clear definition of all the elements and components that comprise the investigation (Then, 1996). This chapter reviews the literature on research methodologies including the empirical properties of a valid research so as to gain valuable insight that can be used to guide the research approach.

There have been debates over the respective merits and demerits of the two main research paradigms – qualitative vs. quantitative. The aim of this chapter however, is to draw on the very essence of these paradigms and state where this research sits and why the choice of the particular paradigm. Citing the works of Thomas Kuhn on how scientific innovations are brought about, Hofstede (1991) indicated that in a given period, certain common assumptions called 'paradigms' dominate the scientific field and constrain the thinking of the scientists at the time. Kuhn labelled research carried out within these paradigms as 'normal' science, but every now and then normal science runs into limits because it is unable to explain new facts or unable to meet new challenges. The result is that a paradigm change is initiated which initially may not sit favourably with those involved in the normal science. However, gradually more and more people move to the new paradigm which then becomes part of a new type of normal science. Though this statement refers to works in the natural sciences, the social/management sciences dealing with individual and collective human behaviour have their paradigms too, but there are fewer consensuses at a given time as to which paradigm dominates.

The paradigm issue in construction management related research also generated considerable debate in the mid 1990s where there were strong arguments for or

against the two main research paradigms in this field - qualitative vs. quantitative (Raftery, *et al* 1997; Seymour et al, 1997; Runeson, 1997; Seymoure and Rooke, 1995). The conclusion that could be drawn from these debates was that project management is a multi-paradigmatic discipline and the choice of emphasis on a particular paradigm is governed by the main objectives of the research and the projected outcome and the audience to which it is meant to be addressed. As noted by Punch (2000), it is not a case of which strategy is best but rather the strategy is detected by the research questions.

## 4.2 The Nature of Scientific Enquiry

Research is the orderly search for truth and as such, according to Sekaran (1992), it must have some distinguishing characteristics to make it truly scientific. To him, there should be *purposiveness* in scientific research where the researcher must have a definite aim or purpose for the research, in addition to *rigor* in the search for that truth. A rigorous research involves a good theoretical base and a well thought-out methodology. He also added that the findings must be *testable* and should have elements of *replicability, generalizability, objectivity and confidence of precision*. To him these elements form the hallmark of sound scientific research.

Then (1999) citing the works of Buckley *et al.* (1995) also gave an operational definition of research that requires the satisfaction of a number of conditions. These conditions include:

a) the orderly investigation of a defined problem;

b) the use of appropriate scientific methods;

c) the gathering of adequate and representative data;

d) logical reasoning uncoloured by bias being employed in drawing conclusions on the basis of the evidence presented;

e) a demonstrable prove of the validity or reasonableness of the conclusions;

f) the cumulative results of research in a given area should yielding general principles or laws that may be applied with confidence under similar conditions of the future.

Figure 4.1 provides an overview of a valid scientific enquiry which Sekaran (1992) refers to as the building blocks of science.

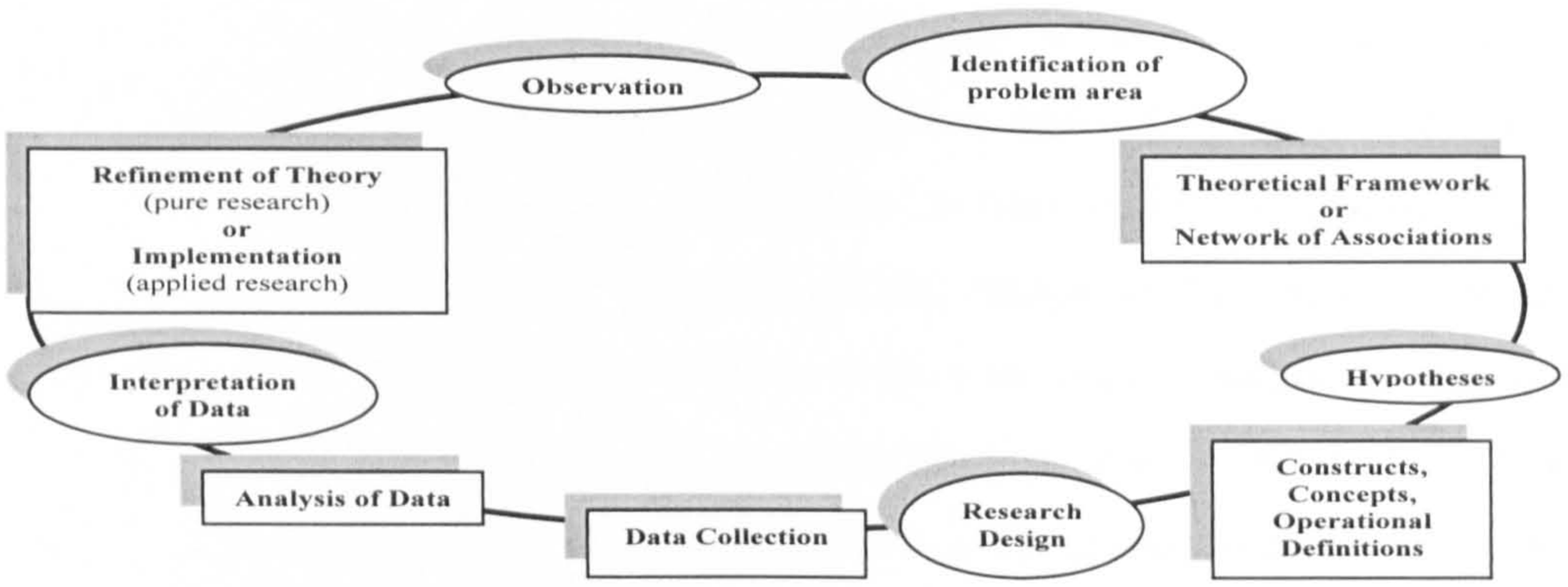



**Figure 4.1 The Building Blocks of Science**
Source: Sekaran (1992 pp 15)

## 4.3 Quantitative vs. Qualitative methodology

Empirical research according to Punch (2000) involves data which are of two types – Quantitative and Qualitative. In distinguishing between these two forms of empirical data, he defines quantitative research as empirical research where the data is in the form of numbers while qualitative research is empirical research where the data is *not* in the form of numbers. Giving a historical overview of social research he pointed out that the traditional dominance of quantitative methods as a way of doing empirical research has been challenged over the past thirty years, leading to the emergence and major growth of interest in using qualitative methods. However as the debate over which approach is more appropriate for a particular piece of research matured, interest has recently been generated in combining both approaches.

Figure 4.2 provides an indication of the Quantitative versus the Qualitative research continuum.

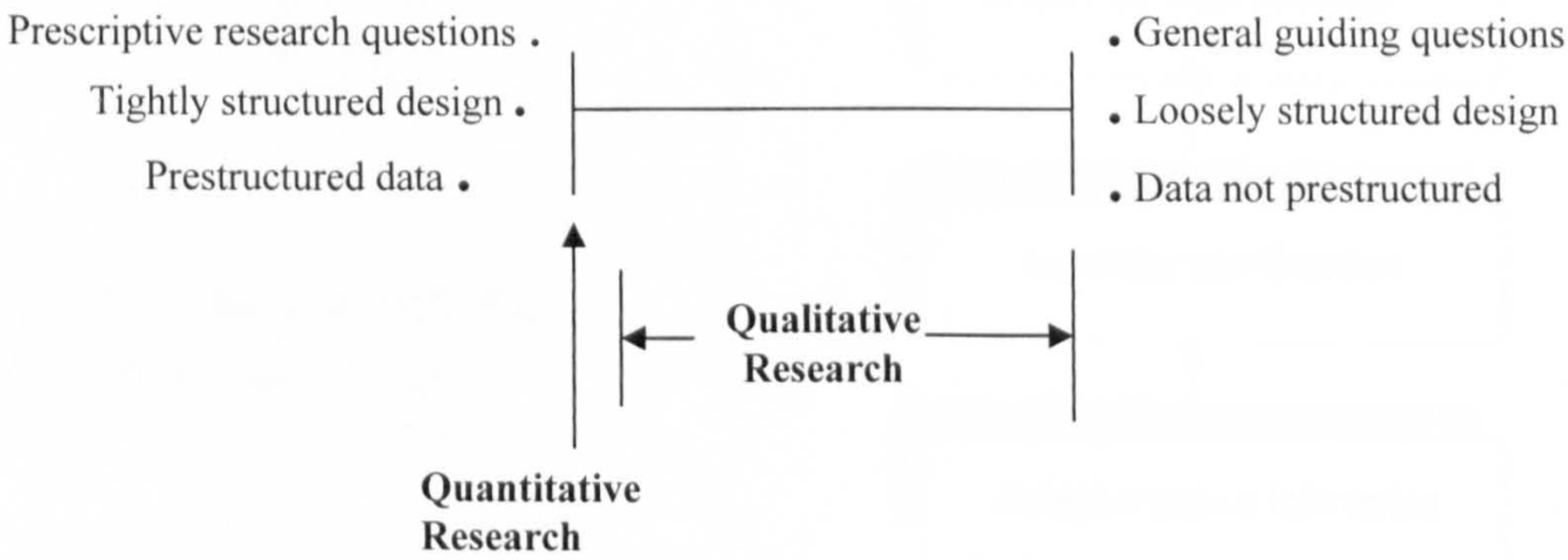



**Figure 4.2 The Quantitative vs. Qualitative research continuum**
Source: Punch (2000 pp 23)

Quantitative research is based on well-developed research questions, conceptual frameworks and tight designs linking the variables, and highly structured data. This form of research is therefore more towards the left hand end of the continuum, where the research question, the focus, the data, and the design of the research instruments are specified and structured ahead of the empirical work. Qualitative approach is much more diverse and therefore more towards the right side of the continuum where the focus in the research questions, the structure in the design and the data unfold as the empirical work proceeds. According to Punch (2000), by comparison with quantitative research, qualitative research is multidimensional and pluralistic with respect to paradigms. The effect of this development in qualitative research is that social research is a human construction, framed and presented within a set of discourses and sometimes ideologies, and conducted within a social context.

Creswell (1994) outlined the role of theory and the deductive or inductive mode in these two research paradigms as shown in Figures 4.3 and 4.4

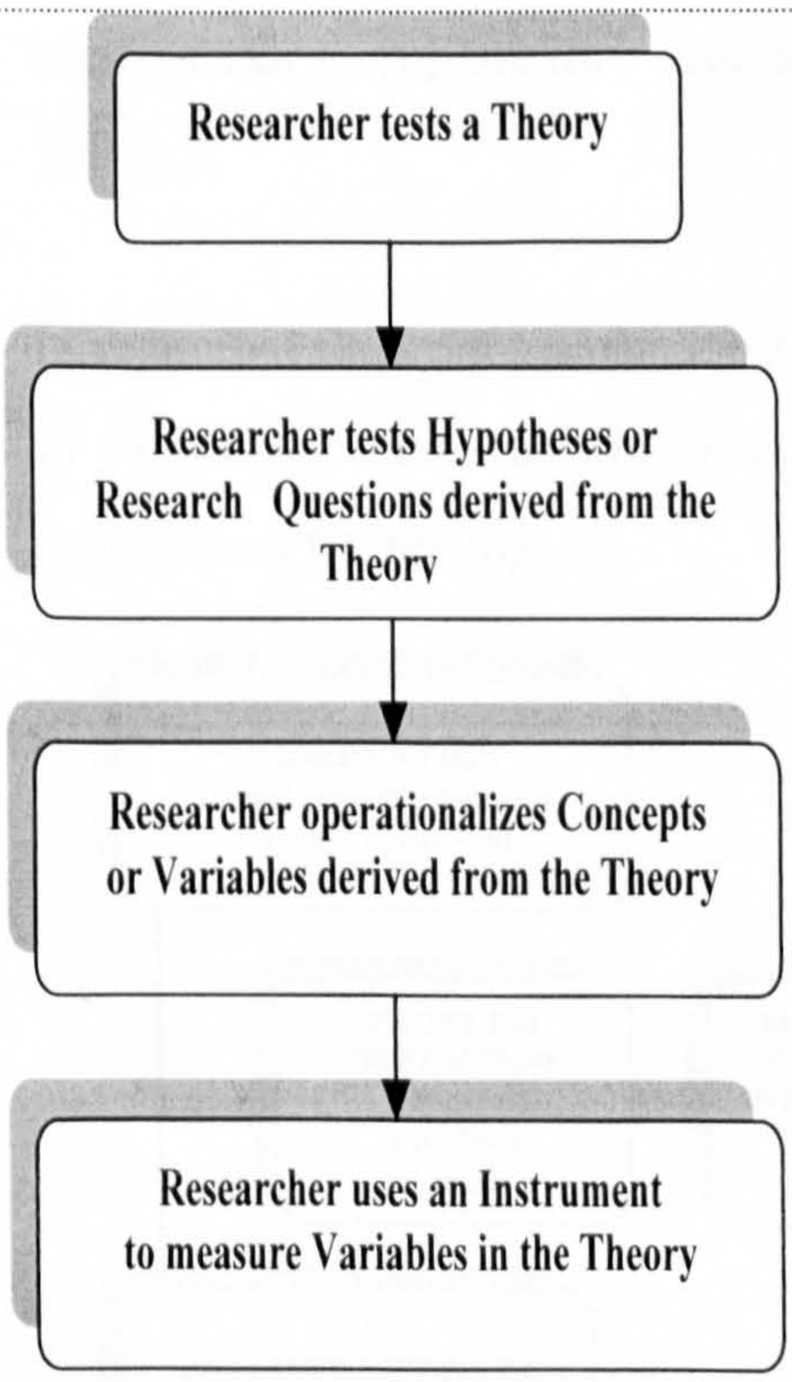



**Figure 4.3 The Deductive Mode of Research in Quantitative Study**

Source: Creswell (1994 pp 89)

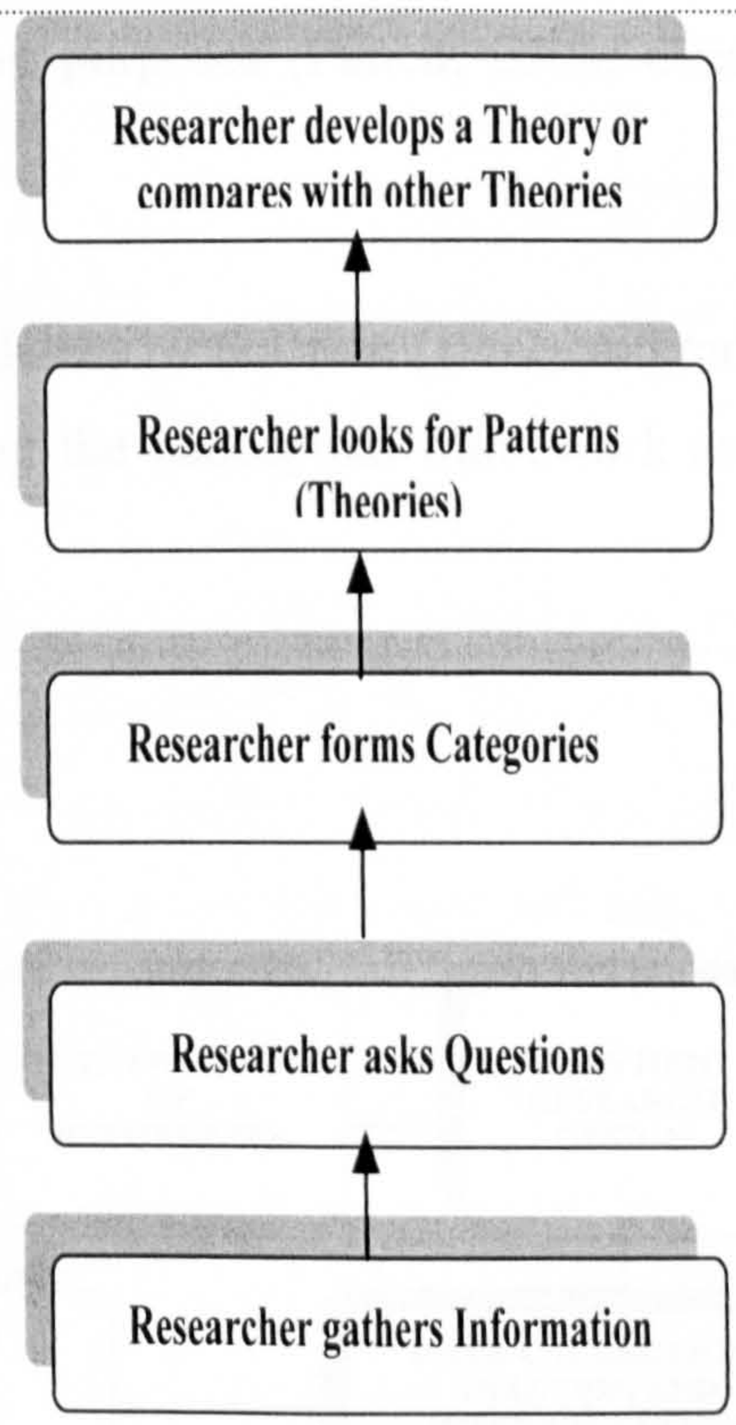



**Figure 4.4 The Inductive Mode of Research in Qualitative Study**

Source: Creswell (1994 pp 88)

### *4.3.1 Quantitative*

The quantitative approach generally holds that the researcher should remain distant and independent from the researched. Hence in survey and experiments, researchers attempt to control for bias by selecting systematic samples and objectively assessing the situation. The quantitative methodology therefore uses a *deductive* form of logic by testing theories and hypotheses in a cause and effect order. Hence according to Creswell (1994), concepts, variables and hypothesis are chosen before the study begins and remain fixed throughout the study with the intent of developing generalizations that contribute to the theory so as to better predict, understand or explain a phenomenon. The quantitative approach therefore involves the review of substantial amount of literature in order to provide direction for the research question and hypotheses and thus setting the study firmly within a theoretical body of related literature. The literature is thus used deductively as a framework for the research questions with the objective of testing or verifying a theory rather than developing it. Hence the theory is first advanced, followed by the collection of the relevant data to test it, and then reflecting on whether the theory is confirmed or disconfirmed by the results of the study. The quantitative methodology is therefore employed for confirmatory, explanatory and hypothesis-testing purposes (Punch, 2000; Creswell, 1994).

In principle the quantitative methodology as modelled by Sekaran (1992) and outlined in Figure 4.5 involves the *process* of developing the conceptual framework and the hypotheses for testing.

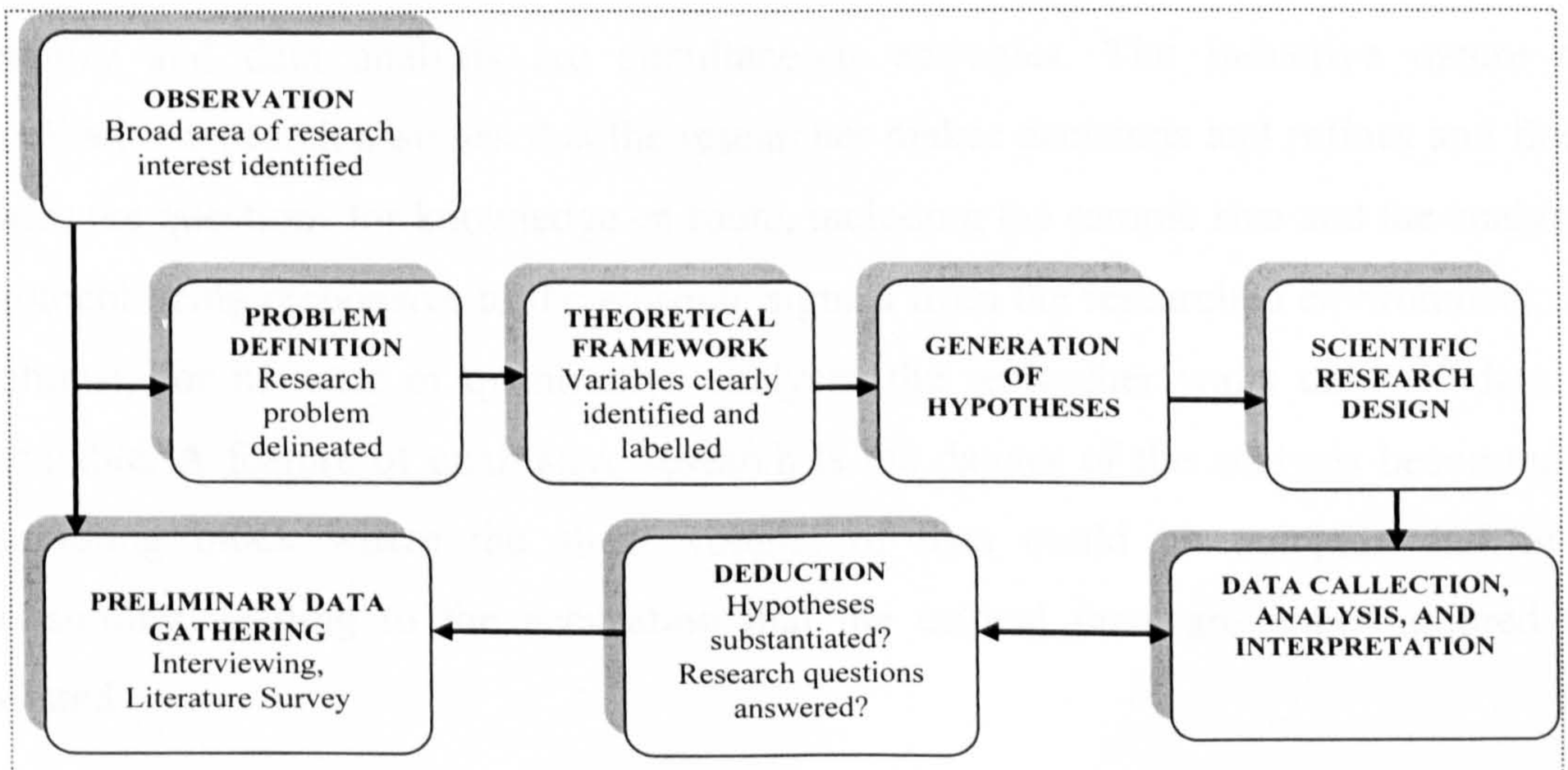



**Figure 4.5 The Hypothetico-Deductive research process**
Source: Sekaran (1992 pp 31)

### *4.3.2 Qualitative*

An important feature of qualitative research is that it focuses on naturally occurring and ordinary events in natural settings in order to have a handle on what 'real life' is like. Data is generally collected in close proximity to the specific situation rather through mail, hence the emphasis is on specific case and thus obtaining data that would provide a rather thick descriptive nature (Miles and Huberman, 1994). For the data to be made powerful to studying a continuous process, they need to be collected over a sustained period so as to be able to assess causalities. According to Miles and Huberman, (1994), qualitative research therefore involves intense and prolonged contact with a field or life situation which is reflective of the everyday life of individuals, groups, societies and organisations, with the researcher's role being to gain a holistic overview of the context under study, its logic, its arrangements and its explicit and implicit rules.

In qualitative research, the logic of the research design is generally inductive - developing patterns from detailed categories or themes, thus suggesting an emerging design where categories emerge from the informants during the study rather than are predetermined a-priori at the start of the study by the researcher. Qualitative design is therefore more towards theory generation that help explain a phenomenon than theory testing as in quantitative approach (Rudestam and Newton, 2001). In this respect, researchers tend to interact with those they study over a prolonged time or through actual collaboration (Creswell, 1994).

According to Krueger (1994) a distinctive feature of qualitative enquiry is that data enquiry and data analysis are simultaneous activities. The inductive nature of qualitative research assumes that the researcher makes decisions and refines and fine-tunes the questions for knowledge en route, including the sample size and the analysis protocol being responsive to the en route signals from the researched environment. In contrast, for numeric or quantitative analysis, the researcher waits until all data is available. A feature of qualitative research is the danger of the analysis becoming a stumbling block where the shear volume of data could be complex and time consuming, leading to the accusation that the critical facts are either ignored or twisted.

Again under qualitative research, the researcher would attempt to capture data on the perception of the respondents from the inside through the process of attentiveness and empathy, with the task of attempting to explicate the ways people in particular setting come to understand, account for, take action and otherwise manage their day-to-day situations. Qualitative data collection therefore involves adopting observation strategies. Qualitative research has therefore been categorised into two broad generalised groups – *phenomenological* and *ethnographic*. The former refers to *interpretivism* where the line of enquiry should lead to a deep understanding, empathy of indwelling with the subject under observation. The phenomenologist therefore works with the interview transcripts in order to capture the essence of the account. The interpretivist therefore insists that the researcher is no more detached from their objects of study than are their informants. The methodology therefore tends to lean more towards descriptive data presentation. Researchers in grounded theory, narrative studies and other applied studies therefore take this line of research. Qualitative research is therefore exploratory in nature in order to build or have a theory emerge. It can, however, be designed to be confirmatory of an existing theory (Punch, 2000; Creswell, 1994).

Qualitative research is therefore generally more of theory building which relies on a few general constructs which are embodiments of a large host of other sub-constructs and are based on a grounded approach to data collection. Here the conceptual framework therefore emerges from the field in the course of the study, although as Miles and Huberman (1994) argue, the a pre-conceptual framework could first be developed based on existing theory, experience and the objective of the research.

Turning to the sampling for qualitative data, a key feature is that the sample tends to be small and studied in-depth unlike quantitative research which aims at establishing statistical significance and therefore deals with larger samples. Miles and Huberman citing Firestone (1993) stated that sampling for qualitative data also turns to be *purposive* rather than random since with small numbers the data could be biased. The sampling is also theory-driven either up-front or progressively as in grounded theory research.

## 4.4 Strengths and Weaknesses in both Paradigms

Both methods have their inherent strengths and weaknesses. But as has always been argued, the choice of a particular approach should depend on the purposes, the context, the circumstances and practical considerations of the study than on philosophical considerations (Punch, 2000; Creswell, 1994; Sekaran, 1992.)

### *4.4.1 Quantitative*

Some of strengths in the Quantitative (Positivist) research method are that it provides wide coverage of a range of situations, and there is an advantage in speed and economy where statistical data are aggregated from large samples. However the weakness in it is that the methods used tend to be inflexible and artificial and are not very effective in understanding processes or the significance people attach to actions; and are also not helpful in generating theories (Then, 1999).

According to Hofstede (1991) hard, quantitative studies have the advantage of reliability in the sense that they are independent of the person of the researcher, and that there is stability of the instruments over time, thus allowing 'longitudinal' research. Unlike soft-data-based research (qualitative research), quantitative research helps to overcome resistance to bad news among the people concerned with such questions as *"On how many interviews did you base this opinion?"* To him, Managers who operate in a hard-data, bottom-line culture can incorporate it more readily in their consciousness. However, the disadvantage is that it can easily become mechanistic giving rise to the idea that the outcomes can be manipulated. Hence in order to get the best of both worlds, both the qualitative and the quantitative approach can be adopted by way of in-dept interviews as well as paper-and-pencil survey.

### *4.4.2 Qualitative*

In the Qualitative approach, data gathering methods are seen to be more natural than artificial, and affords the possibility of looking at change processes, including the ability to understand the meaning people assign to an issue, and the ability to adjust to new issues and ideas as they emerge. The weaknesses however is that data collection can be tedious and would require more resources including difficulty during the

analysis and interpretation of data. It involves conducting the research through an intense and /or prolonged contact with a field or life situation (Then, 1996).

Qualitative data may at times involve case study research. However such studies inevitably raise questions of reliability and generalizability, in terms of whether another observer could perceive the same phenomena, or whether the findings could be said to be representative of the general order of things (Punch, 2000).

One difficulty with the qualitative approach is achieving access to a sufficient number of respondents and/or organizations. There is also the added problem of time limitations and financial cost of travelling and conducting the interviews and the respondents making up time for the interviewer.

## 4.5 Benefits of combining the two paradigms

Miles and Huberman (1994) citing Greene *et al* (1989), suggested three broad reasons for linking qualitative research with quantitative research. These include the ability to confirm or corroborate data via triangulation, to elaborate or develop analysis, to initiate new lines of thinking through attention to surprises or paradoxes by turning ideas around and providing fresh insight.

It is also argued that by combining the two approaches in a sequential manner, the study results can inform the manner in which the next stage and/or approach can be structured. Using the two approaches for one study can also help expand the scope of the study. Again quantitative data can help with the qualitative study during the design by finding a representative sample and locating the deviant cases. It can also help during data collection by supplying background information and helping to avoid bias. During analysis the quantitative data can help by showing the generality of the specific observations and cast new light on qualitative data. On the other hand, qualitative data can help the quantitative side of the research during design during the conceptual development and instrumentation. Qualitative design can also help during the data collection by making access and data collection easier and during analysis by validating, interpreting, clarifying and illustrating quantitative findings in addition to

strengthening and revising theory. The combined approach could adopt any of the following sequences proposed by Miles and Huberman (1994). These sequences are:

1) A steady and integrated collection of both quantitative and qualitative field data as needed to understand the case at hand.

2) A sort of multi-wave survey where both qualitative and quantitative data are collected in parallel with the first wave of data analysed to inform the nature of collection of the second wave of data collection.

3) Alternating the two kinds of data collection such as qualitative (to explore the field) followed by quantitative (through questionnaires) and then qualitative to deepen and test findings.

4) An initial quantitative survey to help point the researcher to phenomena of importance, moving to the qualitative stage to develop a close-up, strong conceptual understanding of how the things work, then followed by a quantitative experiment designed to test some results or competing hypotheses.

## 4.6 Empirical properties of a valid research

According to Hofstede (1991), for information about a population to be considered valid, it has to meet four basic criteria.

- It should be descriptive and not judgemental otherwise it will only contain more information about the value system of the informant than about the particular population.

- It should be verifiable from more than one independent source, other than that it will only reflect one subjective perception.

- It should apply, if not to all members of the population, at least to a statistical majority, otherwise it risks being labelled as a false generalization.

- It should discriminate, i.e. it should indicate those characteristics that apply to this population but not to others, otherwise it is trivial.

A sound research therefore needs to meet five somehow overlapping basic criteria according to Miles and Huberman (1994). These criteria are:

- objectivity/confirmability;
- reliability/dependability/auditability;

- internal validity/credibility/authenticity;
- external validity/transferability/fittingness
- utilization/application/action orientation.

A good piece of research should provide enlightenment by lifting understanding to a new level. The potential for this has much to do with how the study is framed, who was selected to participate and the nature of the questions. This would involve the analyst in seeking strategies that will attempt to find out answers to what was known and then confirmed and/or challenged by the study; and finally what was new that was not previously suspected. Others include comparing and contrasting the result with established theory or present the results in terms of typologies that provide classification systems to enable users to identify critical parts of a larger system, by representing a phenomenon and visual forms such as models or diagram as symbolic images that debit relationships that are critical to the understanding of the processes (Krueger, 1994).

Generalization therefore becomes an important element of a sound piece of research work. The generalization process in quantitative research in particular may involve generalization from sample to the population, but may also include analytic or theory connected generalization or case-to-case transfer in case study research (Punch, 2000). In this respect *sampling* plays a crucial role in determining the reliability of a research outcome. Fundamental to any piece of sound study is how to obtain a representative sample of a population since a biased sample makes it impossible to make accurate predictions about the population or make any sound inferences from the data collected. A number of sampling methods have been proposed in the literature, each with their respective strengths and weakness. Carter and Williamson (1996) for example, categorised the various sampling methods into two broad categories – probability methods and non-probability method. The later includes such methods as convenience sampling, judgment sampling and quota sampling. Though economical and practical in many circumstances, it is normally referred to as non-scientific since it cannot guarantee that every individual in the population has had an equal chance of being included in the sample. Probability sampling involves selecting at random the required number of subjects for the sample; hence each member of the

population has an equal chance of being selected. Methods here include simple sampling, systematic sampling, stratified sampling and cluster sampling.

## 4.7 Validating and confirming findings

Testing against independent data is called validation and scores need to be correlated strongly enough with the scores obtained by the model to eliminate a chance explanation. In order to assess data quality, there is the need to check for representativeness in the data, weighting the evidence, and checking for researcher's effect. There is also the need to look for patterns in the data, and following up surprises and looking for negative evidence. Testing for explanations involve making if-then tests and rule out spurious relations and replicating the finding and checking out rival explanations. A good explanation also deserves attention from the very people who provide the initial data through feedbacks.

Checking for representativeness refers to the procedure necessary to confirm that the findings could be generalized. The pitfalls for inappropriate generalisation include sampling non-representative informants, generalising from non-representative events or activities and drawing inferences from non-representative processes. The resulting sources of error include over-reliance on accessible and elite informants, over-weighting dramatic events and heavy reliance on plausibility (Miles and Huberman, 1994).

### 4.7.1 Feedbacks

Checking for feedbacks is one of the most logical sources of corroboration of the results of the data analysis as the respondents or informants can act as the main repository of the relevant knowledge and therefore in a better position to comment effectively on the findings of the research. Feeding findings back to informants is therefore a venerated practice in research and should effectively not only act as an important means of validation and confirmability of the research findings but also as an ethical way of recognising the contribution of the respondents to the outcome of the research. Analysis is improved with feedbacks because it benefits from multiple

insights and perspective. Corrective feedback could come from respondents, co-researchers, experts and decision-makers (Krueger, 1994; Guba, 1981; Stake, 1976).

There are however pitfalls in feedbacks. A respondent may have a new view of the situation or take some new action as a consequence of an experience in the intervening period between the initial data collection and the feedback time which may change his/her views on the situation under study. As suggested by Miles and Huberman (1994), where such observations are noticed in the feedback information, an effective way to check for the change in the opinion is to do a telephone follow-up. What informants do is to comment on or respond to the results of the analysis and the degree of its accuracy and the reasons given to justify them. The predictions/analysis are drafted and then submitted to the informants to which the respondents/informants will respond. A key to getting a good response is to choose informants/respondents, who have proven to be reliable in their response to and have interest in the study; in a position to know the current situation; and occupy differing roles and somewhat differing perspectives on the research focus.

One of the drawbacks in feedback is a situation where the informants are not familiar with the information due in part to sophistication in presentation or use of jargons or not being an expert in the field. Another drawback is where the report conflicts with the informant's values and beliefs or thinks he/she thinks the report is biased (Guba and Lincoln, 1981).

One other approach to validation is replicating the findings by looking at multiple cases by finding a pattern in a cross case display and tracking through the all the cases to see whether the pattern is repeated. Alternatively, to improve the confidence scale of the findings, the hypothesis can be tested in another part of the case or data set. Stronger still is to replicate in a totally new case in a new environment, or to check out rival explanations and hypothesis to confirm or disprove the findings (Miles and Huberman, 1994).

### 4.7.2 Objectivity

Objectivity in research refers to the extent to which the conclusions depend on the subjects and conditions of the enquiry rather than the enquirer, and the ease with

which the research can be replicated by others. This may sometimes be referred to as external reliability (Guba and Lincoln, 1981). This bring into mind whether the methods and procedures are described explicitly and in detail for a complete picture to emerge in the minds of readers; whether the data collection and transformation processes have been clearly stated; and whether the conclusions are explicitly linked with the displayed data. Others include whether study data are retained and available for analysis by others; and whether records are made available of the study methods.

### 4.7.3 Reliability

The issue of *reliability* relates to consistency in the process of the study and covers such areas as to the clarity of the questions and the research design being relevant to the questions; and clearly specifying basic paradigms and analytic constructs i.e. whether the research is founded on existing or emerging theories. Others include collecting data across the full range of settings and from relevant respondents; checking for the quality of data against biases and informants knowledgeability; and effective colleague and peer review. Within quantitative research, principally two methods can be adopted to check for reliability – the *test-retest* approach where an identical measure is tested on the same sample over two distinct periods and the reliability coefficient is obtained; the *split-half* approach where data obtained during a single survey is split into two halves and the reliability coefficient is obtained (Punch, 2000; Sekaran, 1992). According to Punch (2000), either method can be used to estimate the reliability of a measuring instrument.

### 4.7.4 Internal validity

Internal validity involves the process of checking and questioning in order to find out whether the findings make sense. This would involve finding out whether the accounts rendered are comprehensive enough; whether the validation of the findings produce converging results and whether the rules used for the confirmation of the propositions or hypotheses are made clear and explicit. Others include checking to find out if the conclusions arrived at are confirmed by the original informants and if not whether there is a coherent explanation for this; and replicating the findings in other parts of the database than the one they arose from. Internal validity according to Punch (2000) therefore refers to the internal logic and consistency of the study.

### 4.7.5 External Validity

A piece of study is said to meet the requirements of e*xternal validity* if the findings can have a larger import and therefore said to be fairly generalized. One level of generalization suggested is from sample to population (Sekaran, 1992). The process therefore involves the researcher clearly suggesting settings where the findings could be fruitfully tested further and that the replication effort can be made without any difficulties. Others include clearly defining the boundaries and scope of the research to allow for reasonable generalization, in addition to explicitly stating areas where the findings cannot be generalized; and clearly defining the characteristics of the original sample and processes, to permit adequate comparisons with other samples. Research analysis according to Krueger (1994), must be verifiable – a process that would allow another researcher to arrive at similar conclusions using available document or raw data. In order for analysis to be verifiable there must be sufficient data to constitute a trail of evidence. Generalizability of a research finding according to Sekaran (1992) refers to how far the research findings in one organisation or within a set up can be applicable to another.

Every research effort should aim at not only contributing to knowledge but must enhance the quality of the way things are done. A sound research should therefore aim at enhancing the level of understanding and sophistication and to enable stakeholders to take necessary steps to improve their way of doing things. Miles and Hubermann (1994) raised such questions as whether the research findings are intellectually and physically accessible to potential users and whether the research report contains rich levels of useful knowledge such as the development of insight, consciousness-raising, corrective recommendations and action plans. Others include whether the outcome of the research could improve and or develop new capacity among the end-users of the research findings.

For quantitative research, checking for external validity towards the generalization of the findings involves what has been termed *population validity* based on the adoption of an appropriate sampling (Punch, 2000). Punch, citing Zeller (1997) stated that there is no foolproof procedure to establish validity. In this respect it is suggested that a validation strategy may include both qualitative and quantitative approaches in the

sense that a valid inference occurs when there is no conflict between results obtained as a result of the use of different methodologies.

### 4.7.6 Types of validity tests

Table 4.1 provides a summary of the various types of validity tests available for assessing the soundness of a measure or model. According to Sekaran (1992), these validity tests could be grouped under three main categories – *Content Validity* which will also include face validity; *Criterion-related Validity* which encompasses, concurrent validity and predictive validity; and *Construct Validity* that includes convergent validity and discriminant validity.

**Table 4.1 Types of Validity**

| Validity | Description |
|---|---|
| Content Validity | Does the measure adequately measure the concept? |
| Face Validity | Do "experts" validate that the instrument measures what its name suggests it measures? |
| Criterion-related Validity | Does the measure differentiate in a manner that helps to predict a criterion variable? |
| Concurrent Validity | Does the measure differentiate in a manner that helps to predict a criterion variable currently? |
| Predictive Validity | Does the measure differentiate individuals in a manner as to help predict a future criterion |
| Construct Validity | Does the instrument tap the concept as theorized? |
| Convergent Validity | Do two instruments measuring the concept correlate highly? |
| Discriminant Validity | Does the measure have a low correlation with a variable that is supposed to be unrelated to this variable? |

Source: Sekaran (1992 pp 172)

## 4.8 Models

Models are a means of providing an understanding of something that cannot be visualised or studied as a whole and could therefore be described as a simplified picture of part of the world so as to explain and appreciate the world, the essence of which is to idealise and simplify the problem so as enable one to observe or predict a phenomenon or occurrences. Models are therefore a representation of reality made sufficiently explicit to enable inferences to be drawn. Models communicate ideas and facts about a system, generate new ideas for designing and operating a system, help to

predict how the system will behave in different circumstances, and to provide insight into why the system behaves in a certain manner (Raftery, 1998; Lave and March, 1975).

Raftery (1998), citing the works of Churchman *et al* (1957) and Tate and Jones (1975) indicated that there are three types of models – *iconic models, analogue models, symbolic models, and conceptual models,* each with varying levels of abstraction as shown in Figure 4.6 below.

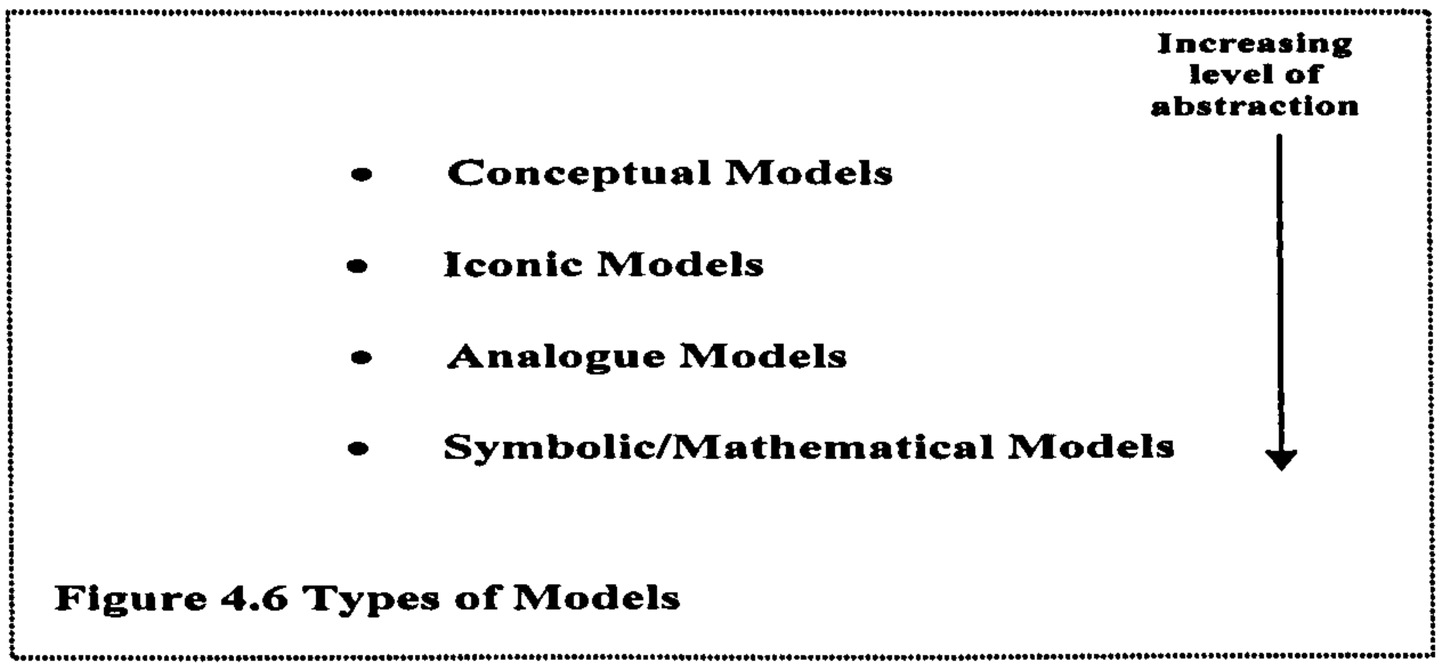



**Figure 4.6 Types of Models**

Conceptual models take into account the variables that are relevant and how they are related and often take the form of flow charts. Iconic models are scaled transformations, examples of which include architectural models. At a slightly higher level of abstraction than iconic models is the analogue model examples of which include the cash flow curve. Symbolic or the mathematical representations of a phenomenon, are the most abstracts of all the models. They are of a greater degree of precisions where the system being studied lends itself to quantitative analysis. Examples may include linear regression equations. According to Ferry *et al* (2003), another form of model is statistical model where some collected information indicates a certain trend. This study will make use of the conceptual model in identifying the attributes that account for the efficient and effective implementation of the PPP procurement strategy during the pre-contract stages; these would then be subjected to statistical analysis to develop a hierarchy of the top significant attributes.

Model building according to Beakley and Chilton (1974), therefore involves *a think process, the development of interesting implications, and looking for generality.* The process therefore includes the formulation of an objective or a set of objectives that

need to be investigated such as time and cost outturns or client satisfaction. Then the underlying dimensions and assumptions about the contributing variables are identified, explicitly making clear what these assumptions are. This is then followed by the formulation of hypotheses which are then tested and validated. Figure 4.7 graphically represents the model building process in a simplified form.

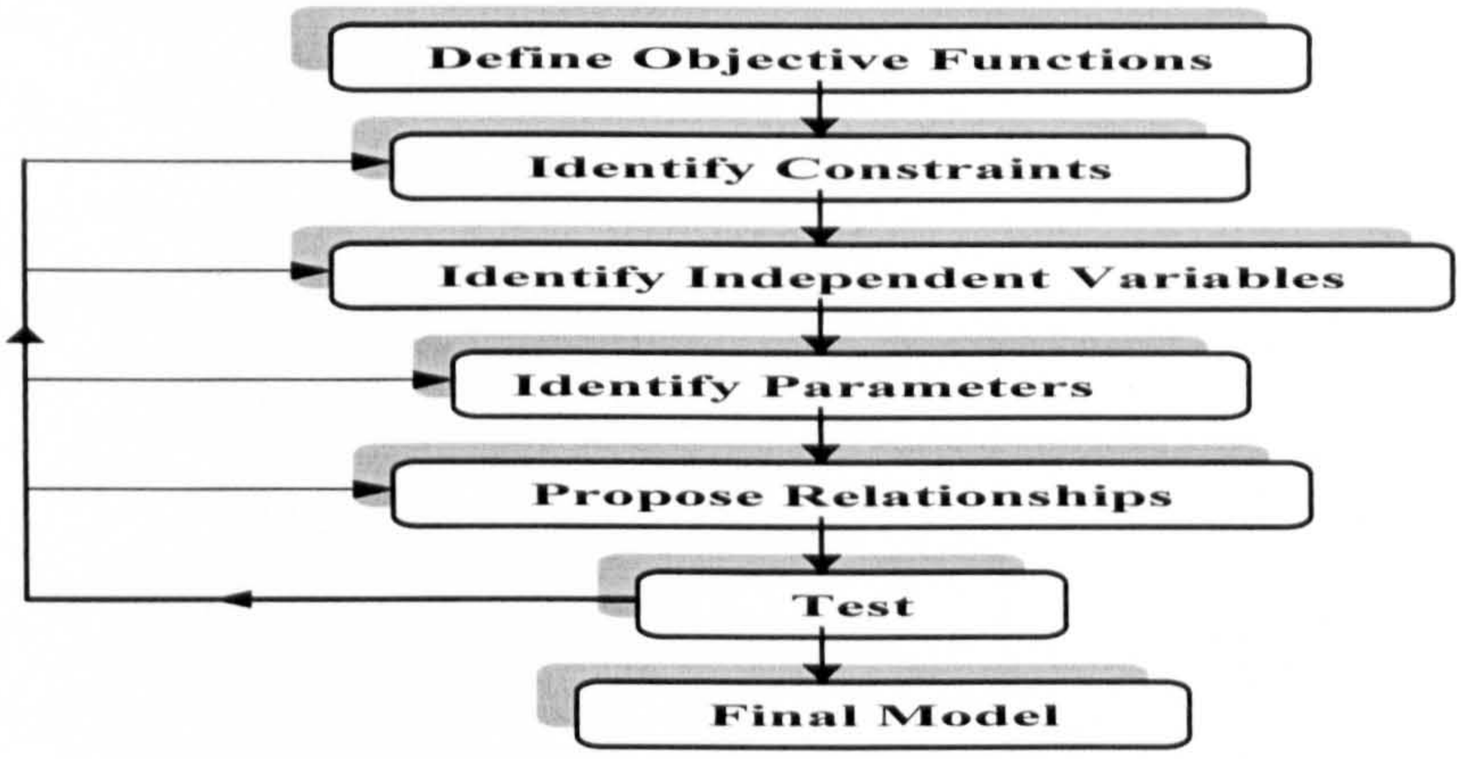



**Figure 6.7 Simplified Model Building Procedure**
Source: Raftery (1998)

Models are therefore a representation of our understanding of a phenomenon at the time and therefore have limitations. As knowledge is advanced, an existing model may be found to be deficient either totally or partially. A good example was the earlier perception of the model of the universe with the earth as flat and at its centre. It was not until the development of the telescope by Galileo that Copernicus's version of the sun rather being at the centre of the universe was proved right (Raftery, 1998). It is therefore imperative that the assumptions made in developing a model and its limitations have to be explicitly stated to guide users of the model.

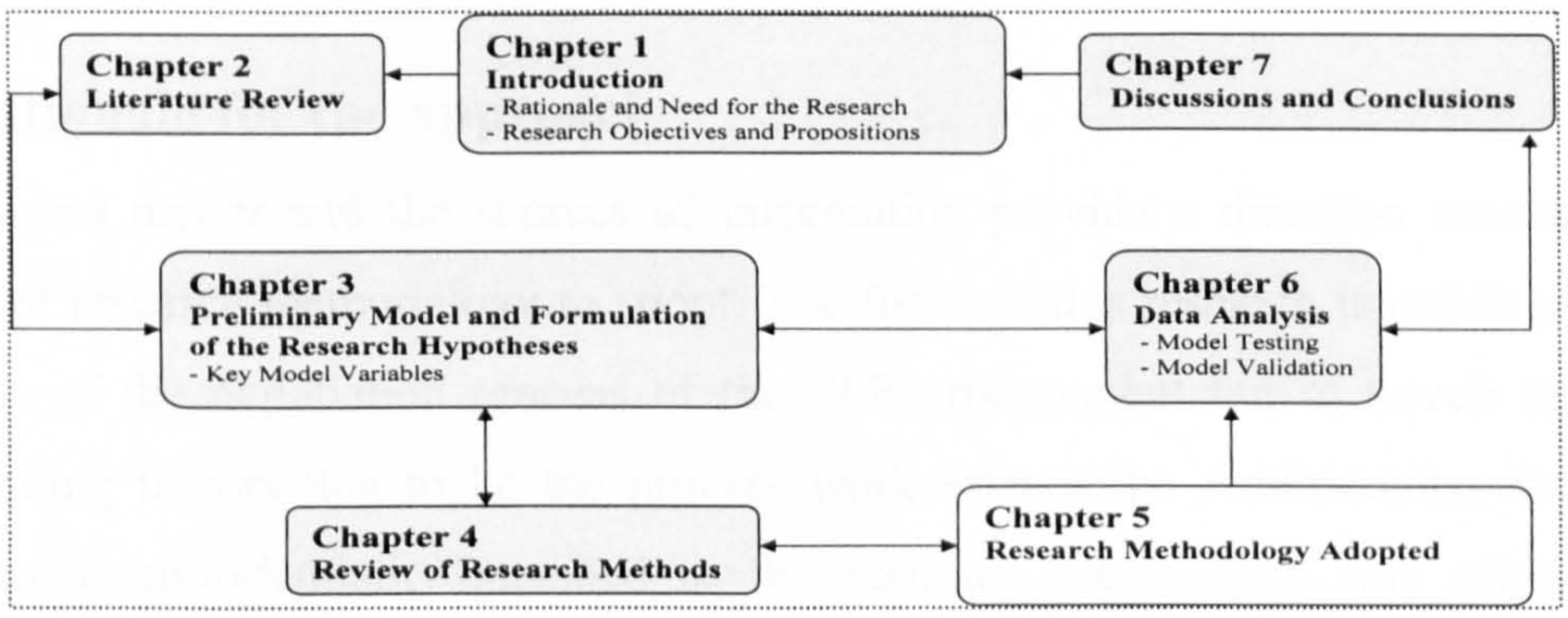
## 4.9 Summary

The review of the literature on research methodologies has provided an insight into the two main research paradigms, by highlighting when it is appropriate to adopt a particular paradigm to meet the objective of a study and their relative merits and demerits. The review also highlighted what constitutes a valid research and how to go about validating a piece of empirical study. The next chapter brings this review into perspective by identifying the methodology appropriate for this study and elaborating

on the approach adopted, the rationale for the choice of approach, and the steps taken to validate the findings of the study.

# Chapter 5: Research Methodology Adopted





# Chapter 5: Research Methodology Adopted

## 5.1 Introduction

This chapter outlines the main methodology adopted for this research – the quantitative approach, the reasons for the choice of this approach and the steps taken to ensure the outcome of the study meets the requirements for a valid research. The study utilised a cross-sectional survey designed to investigate the extent of pre-contract cost and time overruns when using the PPP philosophy in procuring infrastructure projects. The same research instrument was used to obtain data to develop a multi-attribute hierarchical model that captures the key attributes relating to the Public Sector Client, the Consortium, the Project and the External Environment, that impact on the successful negotiation of the PPP contracts. The chapter also outlines the validation processes adopted.

## 5.2 Rationale for the approach

The subject matter and the sources of information provide a direction towards the choice of research methodology to adopt. The focus of this research is not to capture the *how* of the negotiation process of the PPP procurement but to unveil the key contributing factors that make the process work effectively. Additionally, the very commercial confidentiality attached to the contract negotiations only allows for exclusivity, in the sense that only the parties involved are expected to attend and participate in the negotiations. Designing a research instrument that requires observation of the process by an independent researcher will be a near impossibility in this case except he/she is part of the negotiating team or he/she is afforded a special privilege to do so.

Secondly, the aim of the research is to capture opinion from the very active participants within the entire spectrum of the main sectors involved in the PPP project procurement, with a view to gathering a more generic data for analysis. Finally the main focus of the research has an explicit connection to an existing body of knowledge and theory – *negotiation theory*. Viewed against the set objectives and the scope of the research as outlined in Chapter 1, the review of the literature on research methodology therefore points to the choice of predominantly the quantitative

approach. As indicated in Figure 5.1, this chapter therefore outlines the strategy adopted to achieve the set objectives of the research.

The questionnaire approach to the collection of data forms the bedrock of this research methodology. Though a number of weaknesses have been reported in questionnaire surveys, such as biased or distorted responses due to the inability of the respondents to clarify any doubts about particular portions of the questionnaire; poor response rate especially for mail questionnaires; and the inability of the researcher to verify the responses (Sekaran, 1992; Kerlinger, 1973;), these weaknesses are more than offset by the advantages. One of such advantages is the ability to cover a wider geographical area especially when the respondents are widely dispersed, as is the case for this research. Data collection by mail questionnaire method is also efficient as cost and time are minimal in obtaining relevant information on a broad range of topics from a large number of respondents, without unnecessarily disturbing their normal activities. This form of survey also allows the respondents enough time to reflect on the questions and the answers that they may want to provide (Sekaran, 1992; Brook, 1977).

## 5.3 Conceptual definition of the research strategy

Based on the conceptual model of research typologies developed by Danny (1999), the strategy for the current research is as outlined in Figure 5.1 in **bold fonts.**

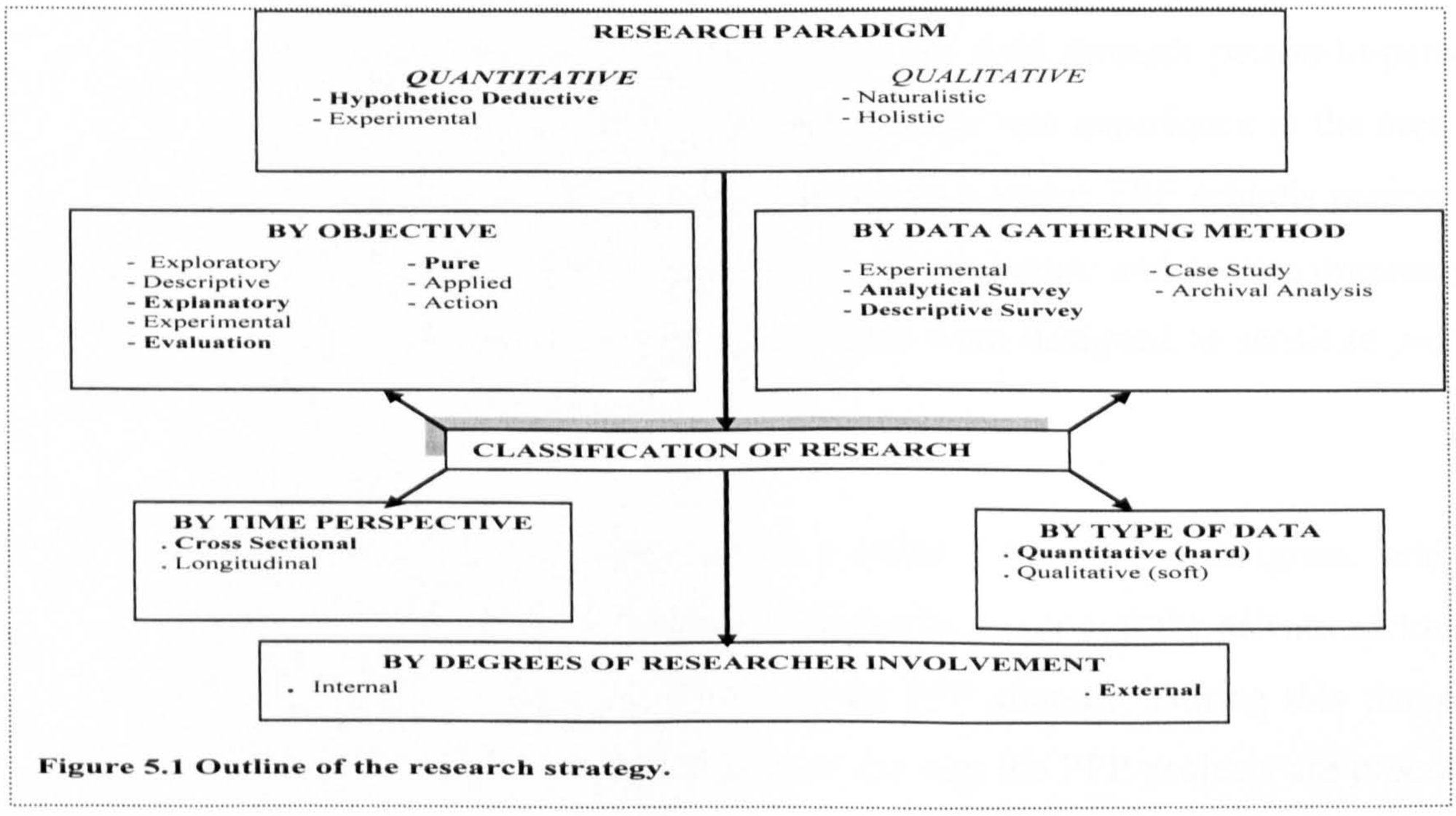



**Figure 5.1 Outline of the research strategy.**

On the basis of the strategy outlined in Figure 5.1, the methodology adopted for this research is as shown in Figure 5.2 below.

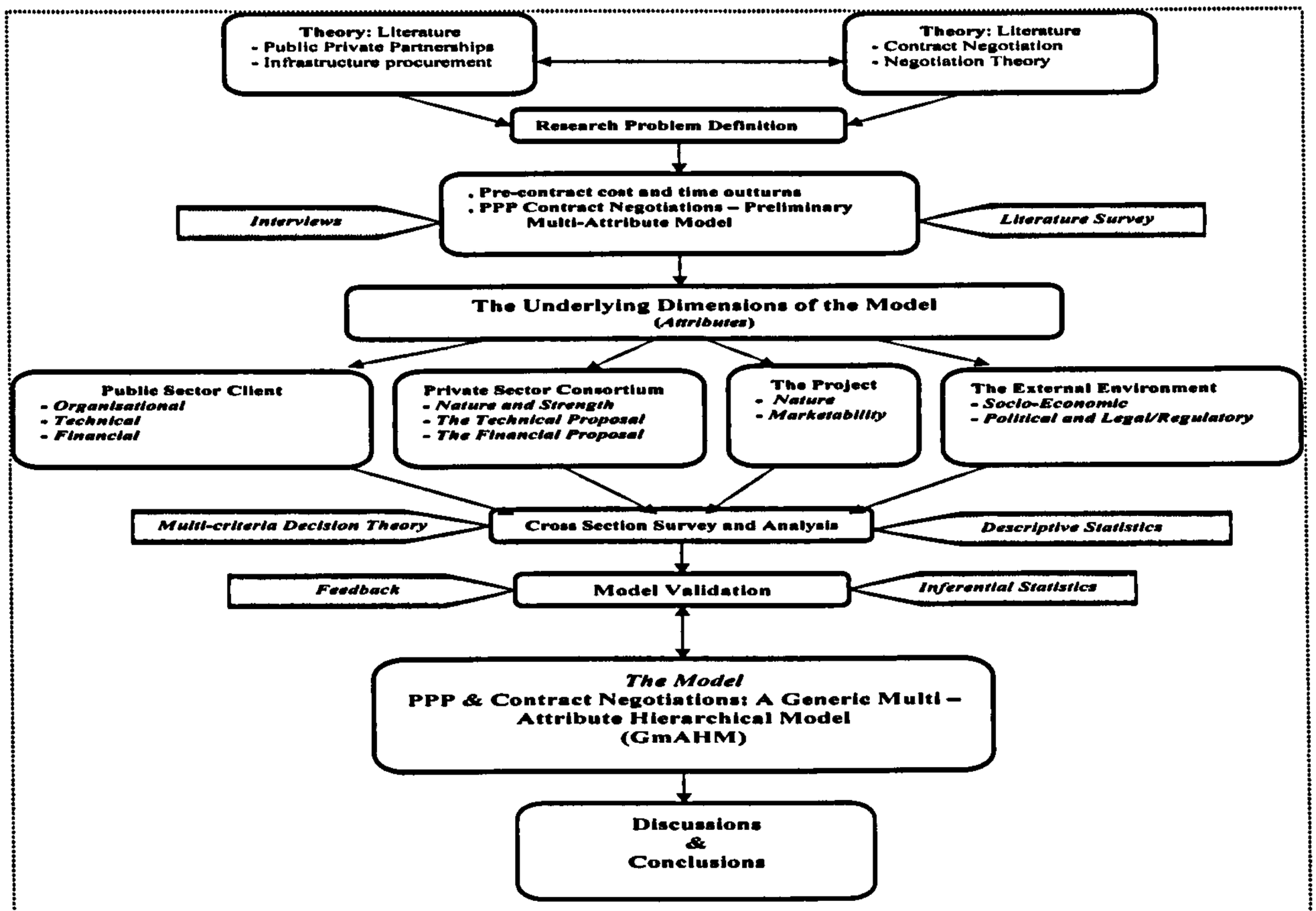



**Figure 5.2 The Research Methodology**

Having decided on the **hypothetico-deductive** methodology as the suitable approach that meets the objectives set for this research, the study commenced with an initial review of existing literature on the processes involved in the PPP procurement and then followed by a thorough review of the literature on negotiation theory. This was followed by contacts made with practitioners in the field through person-to-person interviews. These were practitioners who have had relevant experience in the area of PPP procurement. Workshops and public forums on a major PPP schools project in Edinburgh, Scotland were also attended to gather both public and private opinion on the process. Most of these workshops and forums were designed to sensitise public and end-user opinion on the projects.

This author was privileged to also attend a major international congress held in London that drew major players both from the public sector and the private sector all over the UK and the world active in use of the PPP strategy. During this two-day congress a number insightful issues relating to the way the PPP projects are procured

and the difficulties encountered were thoroughly discussed at workshop levels. The information obtained during these formal interviews and forums and from the relevant literature helped in understanding how the PPP procurement process evolves. This insight, coupled with the knowledge provided through the literature review, shaped the development of the paper-pencil survey and the rest of the quantitative aspects of the research.

## 5.4 Questionnaire design and data collection

The first objective of the study was to establish the extent to which the problems of pre-contract time and cost overruns are real when procuring infrastructure projects using the PPP concept. In order to address this objective, Part 1 of the questionnaire was designed to capture hard data on projects procured in the recent past using the PPP concept. The data required included project values, planned pre-contract time estimates, and actual pre-contract time up to the time the contracts were signed. Others included the initial estimated advisory cost to the participating parties and the actual costs to them up to the signing of the contracts.

In order to collect data to effectively address the second and third objectives of the study, ordinal scale was used to enable respondents rank the attributes. The second objective of the research involves the development of a hierarchy of significant attributes that influence the PPP procurement process, while the third objective involved the examination of the perceptual differences between the public and private sectors on these attributes. The ordinal summated rating procedure is widely used not only in social research but also extensively in construction management related research (Punch, 2000; Wong *et al*, 2000; Kumaraswamy and Dissanayaka, 1998). The ordinal scale has the properties of effectively measuring central tendency through the median, dispersion through semi-interquartile range, and for testing significance using rank-order correlation (Sekaran, 1992). The complete questionnaire can be found in Appendix A.1

The second part of the questionnaire was thus structured as per the following abstract.

*The significance of the consortium attributes refers to the extent to which these attributes influence the ability of the parties to successfully conclude the PPP/Private Finance procurement process from the OJEC Notice/Advert to the eventual signing of the contracts in a timely and cost effective manner.*

*Please tick the appropriate scale as follows:*
***Scale:*** *insignificant = 1, slightly significant = 2, significant = 3, very significant =4, extremely* significant =5

| ID No: | Consortium Attributes | Level of significance 1 2 3 4 5 |
|---|---|---|
| **CS** | **Nature and Strength** | |
| cs1 | Previous experience in PPP procurement. | ☐ ☐ ☐ ☐ ☐ |
| cs5 | Readiness to accept risks. | ☐ ☐ ☐ ☐ ☐ |

The results of any research can be as good as the instruments or measures that tap the concepts. Hence there is the need to use well-validated and reliable instruments. In order to check for consistency and reliability the initial draft of the questionnaire was piloted internally among a numbers of researchers and professors active in project management related research. Valuable comments on the questionnaire were also received from colleagues who have had substantial experience in this form of procurement strategy.

Sekaran (1992), citing Kidder and Judd (1986), noted that a test designed to measure a specific phenomenon can be considered as having validity if it is evaluated by a group of expert judges. This is referred to in the research methodology literature as *content validity* which ensures that the research instrument or measure includes an adequate and representative set of items that would tap the concept under investigation. Secondly, against the backdrop of this author's long years of experience in infrastructure procurement – close to 20 years, the structuring of the questionnaire rendered it to be understood much more easily by the practitioners in the field. As a result, unlike situations where some respondents chose not to complete the questionnaire on the ground of confidentiality, those that were completed were done fully and therefore fully usable.

Data was collected through a cross sectional questionnaire survey approach using the sampling frame described in section 5.5 below. The questionnaires were thus mailed to the respondents accompanied with stamped, self addressed envelopes to facilitate the return of the completed questionnaires. Although mailed questionnaires may have the disadvantage of low return rate, it is a much more effective means of collecting data than the other modes of data collection such as face-to-face or telephone interviews, or personally administered questionnaires where responses to the questionnaires have to be obtained from a sample which is geographically dispersed. It is also a better approach where when a substantial amount of information is to be obtained through structured questions at minimal cost (Sekaran, 1992). This study not only required collecting data from respondents who are geographically dispersed but also a large amount of structured information was required for the study.

## 5.5 Sampling of Respondents

As indicated earlier in chapter 4, sampling plays a crucial role in determining the validity of a research finding. As Punch (2000) points out, for any empirical study, the logic of the sample should fall in line with the overall logic of the study. Again the more representative the sample of the population, the more generalizable are the research findings (Sekaran, 1992). Hence in order to obtain a representative sample which fits this research context and purpose and whose response to the questionnaire would represent the views of the industry players within this new form of infrastructure procurement – the PPP, a thorough attempt was made to draw sample from a credible population which is active in this form of procurement, and not from the general construction industry population. As a result of the network established from the contacts made at a major international congress held in London in 2000 on the PPP strategy, this author was privileged to be provided access by Centaur, to their database. This data base contains the list of key organizations, which are actively involved in the procurement of projects using the PPP/PFI strategy within the UK.

Centaur are the publishers of the PFI Report and the principal organizers of major conferences and workshops on the PPP/PFI concept throughout the UK. They developed the database in conjunction with the HM Treasury. The database was

arranged in a form of a league table in the order of number of signed contracts these organizations and institutions (both public and private) have participated in since the inception of the PFI/PPP concept within the UK in 1992. A detailed profile was also provided on these institutions and organisations including the names of individuals that played key roles in the procurement process. Profiles were also given on the projects these individuals and organisations were involved in. The list was further broken down into the respective categories of institutions and organisations – Funding Institutions, Consultants and Advisors (legal, technical and financial), Property Management Consultants, Contractors and Public Sector Clients. Additionally, the database also contained a comprehensive list of all PPP/PFI projects within the UK which have either progressed beyond the pre-contract stages, in the pipeline or abandoned during the planning stages. The database therefore represented a credible and relevant population frame from which a reliable population sample could be drawn for the purposes of this research.

In all a total of 300 respondents were selected from each of the categories of the institutions and organisations listed. These categories included public sector organisations; consultants such as architects, engineers and project managers; and contractors and facilities managers. Others included funding institutions and financial advisors; property developers/advisors; and legal advisors. In compiling the sample of respondents care was however taken to place emphasis on both experience of the individuals and organizations in terms of the number of projects handled and the a balance of the numbers of the public and private sector respondents as a representative view is required to meet the research objectives.

In effect, a stratified sampling approach was adopted as the respondents were divided into mutually exclusive groups that are relevant, appropriate and meaningful to the context of the study. Stratification, according to Sekaran (1992) is an efficient research sampling design since it provides more information with a given sample size. As Sekaran points out, stratification ensures homogeneity within each stratum in that very few differences or dispersions occur on the variables of interest within each stratum, but there is heterogeneity between strata. Put in another way, there will be more between-group differences than in-group differences. One of the main objectives of this research is to assess the conceptual differences among the subgroups

of the population on the significance of the attributes identified. For a study of this nature the choice of the stratified sampling design has been recommended as the most appropriate form (Sekaran, 1992). Due to the fact that both sides actively engage consultants during the pre-contract stages of the PPP procurement, in order to clearly group the respondents into the two main subgroups – Public Sector and Private Sector Consortium – one of the questions requested respondents to state which one of these sectors they represented on the specific project for which their answers to the questionnaire applied.

The questionnaires were posted to the selected respondents during the first week of June 2002. By mid June, a total of 45 completed questionnaires were received. Thereafter, a number of telephone calls were made to respondents who could be contacted on phone. By the end June 2002 additional 17 were returned making a total of 62, representing a response rate of 21%. As a check for non-response bias, this response rate was compared with response rates obtained for similar UK wide studies on the PPP in the recent past. Bing Li *et al.,* (2002) reported 12% rate (61 out of 500) for their research on Risk Management in PPP and 9.9% (68 of 700) for the Institute for Public Policy Research's (IPPR) call of evidence for consultations on the PPP. According to Roscoe (1975), sample sizes larger than 30 and less than 500 are appropriate for most research.

To facilitate the analysis of the data towards testing the third hypothesis of this research the completed questionnaires were grouped into two respondent categories – Public Sector Client and Private Sector Consortium. In all a total of 24 suitable responses were received from the public sector and the remaining 25 came from the private sector. The next stage was to break them down into the three main sectors of the UK economy where the PPP/PFI philosophy is being vigorously pursued – health, education in the form of schools, and major civil engineering project. One major aim of these subdivisions was to check for any differences in efficiency in terms of the time and cost overruns experienced on their respective projects during the pre-contract stages. The other aim is to demonstrate the robustness of the findings and the resulting model since the model needed to be representative of the entire spectrum of infrastructure procurement using the PPP concept.

A further analysis of the completed questionnaire showed that respondents have had substantial experience in the PPP/PFI mode of procurement and therefore information provided by them could be relied upon. Detailed analysis relating to the profile of the respondents is covered in Chapter 6.

## 5.6 Statistical Instruments used for data analysis

### 5.6.1 Descriptive Statistics

In order to achieve the objective set under proposition 1, descriptive statistics was deployed to analyse the data. Descriptive statistics is a technique for summarizing and describing data and usually deploys mean, mode, median, range, variance and standard deviations; the first three of which are used to measure central tendency within the data and the last three are for measuring dispersion or variability within the dataset. However the mean and standard deviation are the most commonly used statistical tools for descriptive statistics (Punch, 2000; Sekaran, 1992). Project management and construction related research relies extensively on the use of descriptive statistics to explain the outcome of the findings. Ye and Tiong (2003), for example used it in assessing Tariffs and Internal Rate of Return for different tariff adjustment frameworks in BOT projects. Songer and Molenaar (1997) also used descriptive statistics in determining the key success factors for public-sector design and build projects. Others include Tiong and Alum (1997), Anderson *et al*, (2001), and Wong *et al* (2000).

### 5.6.2 Multi-Criteria Decision Theory

The analytical instrument used in examining the data in order to address the second and third objectives of this research is that of Multi-Criteria Decision Theory which is based on the principle that among all achievable scores for any *i*th attribute, there is at least one extreme or ideal value that is preferred to all others. This may be called the 'anchor value' and denoted as x**i*. This ideal place plays a prominent role in decision-making. There is thus the axiom that: *Alternatives that are closer to the ideal are preferred to those that are further away. To be as close as possible to the perceived ideal is the rational to human choice* (Zeleny, 1982 pp 156). Hence as all alternatives are compared with the ideal, those farthest away are removed from further

consideration. The principle is thus based on the assumption that there is an ideal level of attributes for objects of choice. Figure 5.3 provides a graphical representation of this ideal point within a constrained utility space. With limitations to alternatives of choice imposed by the possibility boundary *P*, conflicts between what is preferable (the end) and what is possible (the means) begin to set in. According to Zeleny (1982), as decision makers attempt to grasp the extent of the emerging conflict between means and ends, they begin to explore the limits attainable with each important attribute. The highest achievable scores with all currently considered attributes form a composite - *an ideal alternative x**.

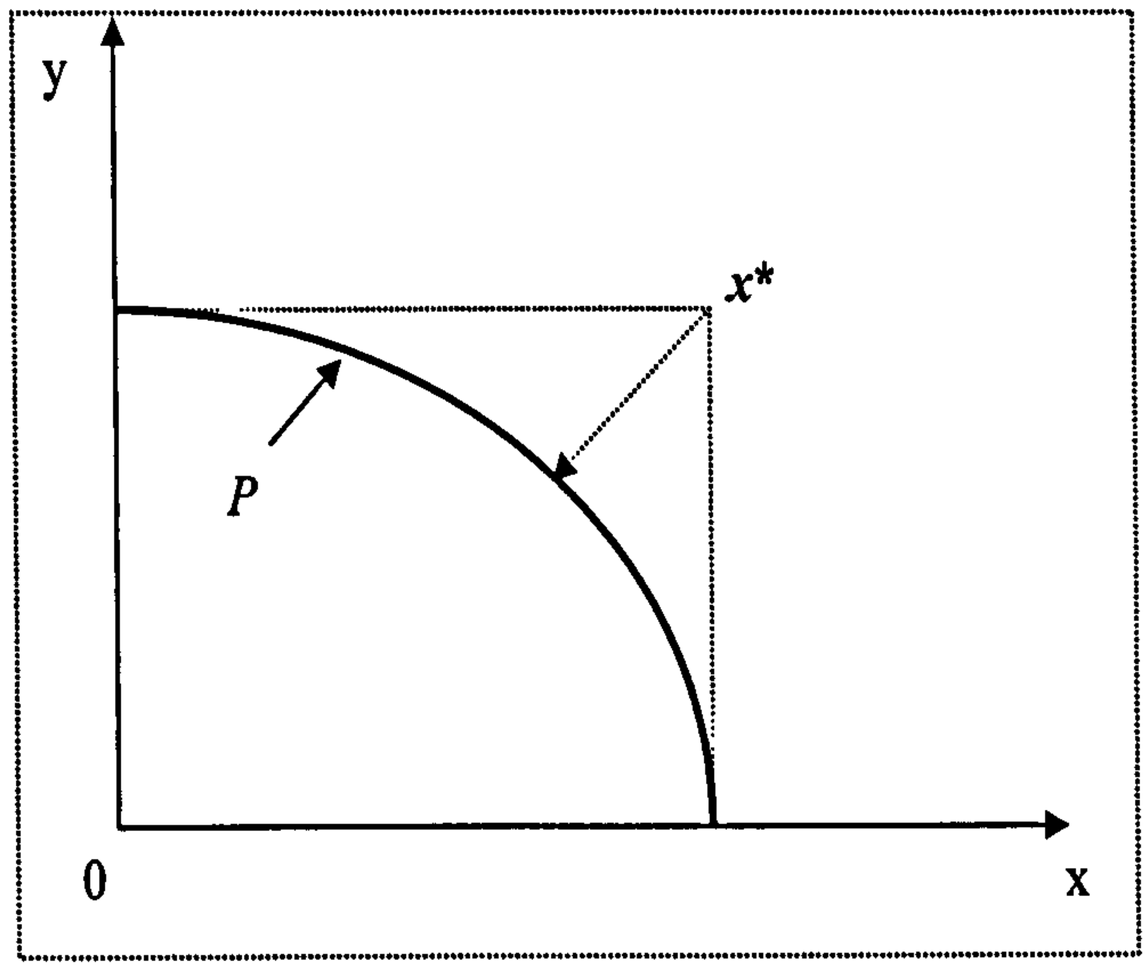



**Figure 5.3 The ideal point *x** in constrained utility space.**
Source: adapted from Zeleny (1982, pp 144)

There are two fundamentally different ways of eliciting weights of attribute importance:

(i) direct explication through interviews, questionnaires, preference or trade-off interrogation or similar; and

(ii) indirect explication in which the decision maker performs a series of overall evaluation through a number of alternatives via ranking where the decision maker's overall evaluations are related to the corresponding attribute levels of the alternatives.

The simplest approach is to have the decision maker range the attributes in order of their significance e.g.: low significance = 1, average significance = 2, and so on. Such ranking of significance could be pre-emptive or additive. Pre-emptive ranking

means that only the highest ranked attribute is considered and all other remaining ones are excluded from the analysis i.e. they are assumed not to be important. Additive ranking or weighting means that all weights have a simultaneous effect. They can be summed and normalised i.e. each weight can be divided by the sum of all weights so that they add to unity. A special case of ranking is rating which asks questions like "what is the relative importance of a given attribute on a scale of one to five?" (Zeleny, 1982).

According to Zeleny (1982), decision-making can be viewed as an information processing activity. Decision–relevant information about available alternatives is transmitted, perceived and processed via attributes. In this sense, the attributes serve as the information sources. The more information is emitted by the *i*th information source, i.e. the *i*th attribute, the more relevant or more salient is the attribute in a given situation. Attributes are the physical or the physiological characteristics, the scores of which can be obtained through an objective measurement e.g.: size, weight, etc. For example, using one of the components under investigation in this study - the *Consortium*, organisational strength, the quality of the technical or financial proposals, could be considered as main attributes with such other underlying dimensions as readiness to accept risks, level of financial guarantees provided, etc, considered as the sub-attributes.

Obviously, most subjectively assessed *a priori* declared weights are independent of the actual information transmitted. In such sense, they are to be used for the initial selection of salient attributes only. From the entire universe of relevant attributes, a smaller number is selected by assigning weights, w*i*. This primary weighting is intended to identify which attribute will be considered initially. Then these attributes again become undifferentiated in terms of their importance. Scores are then assigned and evaluated with respect to a particular set of alternatives. The informational significance is thus established and a secondary weighting (actually the more important one) can take place. Some of the initially important attributes might fail the information criterion and later be discarded. Under special circumstances, for example, when most a priori attributes do not transmit sufficient decision information, some originally none salient attributes can be added to the initial set. In this respect in order to satisfy this aspect of the process, the initial interviews and the literature

search identified hosts of attributes for the main components under study. The preliminary questionnaire drawn up was subjected to intensive scrutiny by two practitioners and two other academics in order to screen and eliminate the non-significant attributes. As a result the sub-attribute considered being least by the respondents during the final questionnaire survey - ability of foreign investors to repatriate earnings from PPP projects - even yielded a score of 0.4.

For the purposes of this research the relative significance of the attributes has been determined by the index:

$$(i_{sub}) = \sum_{i=1}^{n} r \,/(r^* \text{x } n) \qquad (1)$$

and $$(i_{main}) = \sum_{i=1}^{n} r \,/(r^* \text{x } n \text{ x } N) \qquad (2)$$

where $(i_{sub})$ = the relative significance index for the sub-attributes;

$(i_{main})$ = the relative significance index for the main attributes;

r = the degree of significance assigned by each respondent to the *i*th attribute;

r* = the ideal or anchor score i.e. highest score (5 in this case);

n = the number of responses;

N = the total number of sub-attributes under each main attribute.

The derived indexes were then ranked according to their level of significance using the Microsoft Excel function RANK. This methodology has been extensively used in project management and construction related research (see for example Mangitung and Emsley, 2002; Cheung *et al.*, 2000; Wong *et al.*, (2002); Kumaraswamy and Dissanayaka 1998; Okpala and Aniekwu, 1988).

## 5.7 Assessing the Research Findings and the Model for Reliability and Validity

In order to check that the findings of this research are reliable, nonparametric inferential statistical tool was deployed using Spearman Rank Correlation Coefficient. The choice of this statistical test was considered appropriate since the questionnaire survey adopted the ordinal scale as the measurement instrument. The Spearman Rank Correlation Coefficient, according to Conover (1980), is often used as a test statistics to test for independence between two random variables. As such it can be used for hypothesis testing of the following forms.

A) One tail-test for positive correlation:

*Ho:* The *Xi* and *Yi* are mutually independent

*H1*: There is a tendency for the larger values of X and Y to be paired together.

B) One tail-test for negative correlation:

*Ho:* The *Xi* and *Yi* are mutually independent

*H1*: There is a tendency for the smaller values of *X* to be paired with the larger values of *Y*, and vice versa.

C) Two-tailed test:

*Ho:* The *Xi* and *Yi* are mutually independent.

*H1*: Either (a) there is a tendency for the larger values of *X* to be paired with the larger values of Y, or (b) there is a tendency for the smaller values of *X* to be paired with the larger values of *Y*.

*Ho*, refers to the null hypothesis where *H1* refers to the alternative hypothesis. The alternative hypothesis states the existence of correlation between *X* and *Y*; whereas the null hypothesis indicate no correlation between *X* and *Y*.

The Spearman Rank Correlation Coefficient is also a measure of association and as such a measure of the degree of correspondence between the ranks of the sample observations rather than between the observations themselves. It also measures the strength of the relationship between the sample *X* and *Y* values, and also as an

estimate of strength of the relationship between $X$ and $Y$ in the sampled population (Daniel, 1990).

Mathematically, the Spearman Rank Correlation Coefficient $\rho$ (*rho*) is expressed as follows:

$$\rho_{x,y} = \frac{Cov(X,Y)}{\sigma x.\sigma y} \qquad (3)$$

Where:

$$-1 \leq \rho_{x,y} \leq 1$$

and:

$$Cov(X,Y) = \frac{1}{n}\sum_{i}^{n} (xi - \mu x)(yi - \mu y)$$

Statistical tables give critical values of $\rho$ with the following decision rules (Daniel, 1990):

A. (Two-sided): Reject *Ho* at the $\alpha$ level, if the computed value of $\rho$ is greater than the tabulated value for N and $\alpha$ given in the tables or less than the negative of this value.

B. (One-sided): Reject *Ho* at the ($\alpha$) level if the computed value of $\rho$ is greater than the tabulated value of N and $\alpha$.

C. (One-sided): Reject *Ho* at the $\alpha$ level if the computed value of $\rho$ is less than the negative of the tabulated value of N and $\alpha$.

Where:

N is the number of observations;

$\alpha$ is the level of significance (usually 0.05 or 5% for the behavioural sciences);

$\rho$ is the computed value of the Spearman Rank Correlation Coefficient.

As a further check on the accuracy of the analysis in testing the hypotheses, the dataset was further analysed using Kendall's Coefficient of Concordance to test the

degree of agreement or association based on the following statistical relationship (Siegel, 1956):

$$rhoav = \frac{kW - 1}{k - 1} \qquad (4)$$

From which $W$ is derived as:

$$W = \frac{rhoav(k-1)+1}{k} \qquad (5)$$

Where:

$W$ is Kendall's Coefficient of Concordance,

*rhoav* is the average of the computed Spearman Rank Correlation Coefficients, and

$k$ is the sets of rankings.

According to Daniel (1990) and Siegel (1956), for values of N > 7, the probability distribution takes the form of *Chi Square* with N-1 degree of freedom (*df*). The value of *Chi Square* can be computed from the formula:

$$\chi 2 = k(N-1)W \qquad (6)$$

The statistical test of significance of the observed or computed value of $W$ is done by determining the probability associated with the occurrence under the *Ho*. Hence the null hypothesis can be tested that the k sets of ranking are independent. For larger values of $N$ if the computed value of *Chi Square* equals or exceeds that shown in the statistical tables of critical values of *Chi Square* for a particular level of significance and a particular value of $df = N - 1$, then the null hypothesis that the $k$ rankings are unrelated may be rejected at the level of significance.

The Kendall's Coefficient of Concordance measures the extent of association among several ($k$) sets of rankings of $N$ entities, and is useful in determining the agreement among several judges or the association among three or more variables.

According to Siegel (1956), nonparametric statistical tests play a prominent role in research in the behavioural sciences where in many of the statistical tests the data are changed from scores to ranks, most especially when the scale of measurement is the ordinal rather than interval or ratio scale. Parametric statistics tests are more suited to data obtained using interval and ratio scales.

Nonparametric statistical tests have the advantage of being used safely on sample sizes as small as N = 6 (a situation where parametric statistics will be inappropriate). They also have the advantage of being suitable for treating samples made up of several difference populations. Added to these, the Spearman coefficient is much less affected by outliers in the data than other forms of correlation coefficient such as the Pearson. It is therefore much more robust to the presence of outliers in the dataset. With respect to the power of efficiency, the Spearman rank correlation is as good as the most powerful parametric correlation, the Pearson coefficient, at about 91%, provided all the assumptions of the parametric statistical model are met in the data (Siegel, 1956).

One difference between the Kendall's and the Spearman's methods of expressing agreement among k rankings is that $\rho$ may take values between –1 and +1, whereas $W$ may take values only between 0 and 1 (Siegel, 1956 pp 232).

In developing the model, the *split-half* approach was adopted. Split-halve procedure involves the partitioning of a measure into two halves for administration simultaneously. The correlation between the two halves is the reliability estimate (Zeller and Carmines, 1980). This approach was taken due to its practicality in administering the measure only once as opposed to the *test-retest* approach. Obtaining survey data within the construction industry has of late proved to be increasingly difficult, resulting in poor response rates (Root and Blismas, 2003). This research targeted top executives during the survey. These groups of people have limited time at their disposal. Hence subjecting them to a further questionnaire survey in a *test-retest* mode to check for reliability was not only likely going to produce poor response rate, but only obtaining opinion from the same set of people twice as the population set for expert knowledge on the PPP is currently small. Owen (2002) was confronted with a

similar dilemma when using the triangulation approach to validate his research on the PFI in transportation projects as the number of respondents or participations dwindled significantly during the second and third trials. Moreover sufficient data has been collected for this research to allow for the split-half approach to be adopted without sacrificing the statistical requirements for the analysis of the data.

As a further check to test for the robustness of the model, sample data were extracted for schools, hospitals and major civil engineering projects procured through the PPP strategy. These separate pieces of data were used to validate the model using the same inferential statistical method. This final test acted as a diagnostic analysis to assess the generalizability of the results to the total population and as a means of further validating the model (Hair *et al* 1998).

According to Hofstede (1991), two measures are said to be correlated if they vary together, for example height and weight correlating together. However correlation between two measures may never be perfect. The coefficient of correlation expresses the strength of the relationship. Where the correlation is perfect, i.e. the measure follows entirely from the other, the correlation coefficient takes the value of 1.00. Where the correlation is nonexistent, i.e. the two measures are completely unrelated, the coefficient is 0.00. The coefficient can become negative (-) if the two measures are each other's opposite. The lowest possible value is –1.00, in which case the two measures are again perfectly correlated, only one is positive when the other is negative, and vice versa. In statistical analysis, one can expect a coefficient to be about 0.80 or even higher (Hofstede, 1991).

Inferential statistics is a tool that assists in making decisions based on the analysis of the data. Because data is obtained from a sample of the population and not from the entire population, statements need be made of the outcome of study in relation to the entire population, nonetheless; or it may be necessary to know the differences in a variable among different subgroups, or the relationship between two variables (Sekaran, 1992). Hence inferences are being made from the sample to the population by way of generalization. Inferences are therefore based on probability statistics expressed in the form of *confidence levels or statistical significance levels* and are usually expressed as $p < 0.05$, $p < 0.001$, etc. For a 5% probability, it means that the

likelihood of being incorrect is 5 times in 100. The 5% significance or confidence level is usual for social research (Punch, 2000; Sekaran, 1992).

According Punch (2000), there is no full proof procedure to establish validity and that the validation method used should depend on the situation. Citing Zeller (1997), Punch indicated that because all methods have limitations, quantitative or statistical inferences about validity need to be buttressed with qualitative methods. To Zeller, *a valid inference occurs when there is no conflict between messages received as a result of the use of a variety of different methodological procedures.*

A second approach was therefore adopted to further validate the resulting model for content validity, practical relevance and robustness. According to Sekaran (1992) content validity ensures that adequate and representative dimensions have been included in the measure that seeks to tap the concept. It is a function of how well the dimensions and elements of a concept have been delineated. A total of 10 experts were selected, eight (8) of whom were randomly picked from the group of respondents who participated in the initial questionnaire survey. The other two (2) who did not participate in the initial survey were chosen based on their experience in procuring infrastructure projects using the PPP/PFI concept. The feedback questionnaire is included in this thesis as Appendix A.2

Additionally, the rigorous peer review of the journal paper and the three conference papers generated from the research, lends credibility to the research approach and the outcome (Ahadzi & Bowles, 2001a; Ahadzi & Bowles, 2001b, Ahadzi & Bowles, 2003, Ahadzi & Bolwes, 2004). As indicated by Hofstede (1991), for any research finding to be valid, it should be verifiable from more than one independent source; otherwise it would only reflect one subjective perception.

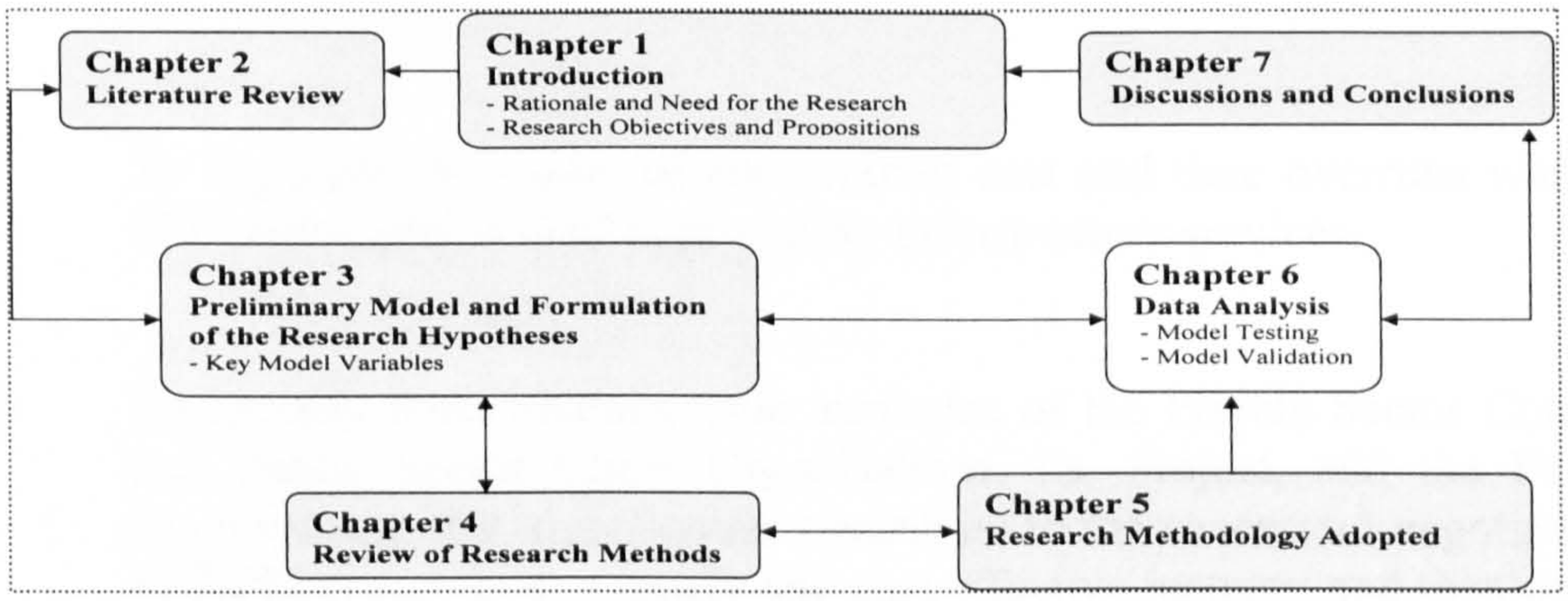
## 5.8 Summary

The foundation for any sound and valid research lies in the approach adopted to solicit information and to analyse the data generated. This chapter provided an in-dept description of the methodology adopted for this piece of study and the steps taken to validate the findings. Central to the study approach is the use of descriptive statistics

to investigate the first objective of the research, and inferential statistics based on Spearman's Rank Correlation and Kendal's Coefficient of Concordance to investigate the remaining two objectives. The next chapter provides a detailed account of the above statistical analysis.

# Chapter 6: Data Analysis and Model Validation





# Chapter 6: Data Analysis and Model Validation

## 6.1 Introduction

The preceding chapter elaborated on the methods adopted to realise the research objectives, and the processes adopted in other to validate the preliminary model and the research propositions. This chapter reports on the findings of the questionnaire survey and the various statistical analyses carried out to develop, test and validate the preliminary model proposed in Chapter 3 and processes taken to validate the propositions of the research. For ease of reference, the research objectives as outlined in Chapter 1 and the propositions under investigation are hereby briefly restated. The research has three objectives.

i) To highlight the extent of pre-contract cost and time overruns when the PPP philosophy is used in procuring infrastructure services.

ii) To identify those characteristic attributes of the Private Sector Consortia and Public Sector Client Organisations, the Project, and the External Environment, that significantly contribute to the successful negotiation of PPP/PFI contracts in a timely and cost effective manner; and then develop a Generic Multi-Attribute Hierarchical Model capturing these respective attributes, the main components of which is illustrated in Figure 6.1.1.

iii) To explore the differences in perception between public and private sector on the relative importance of these attributes in contributing to the negotiation success.

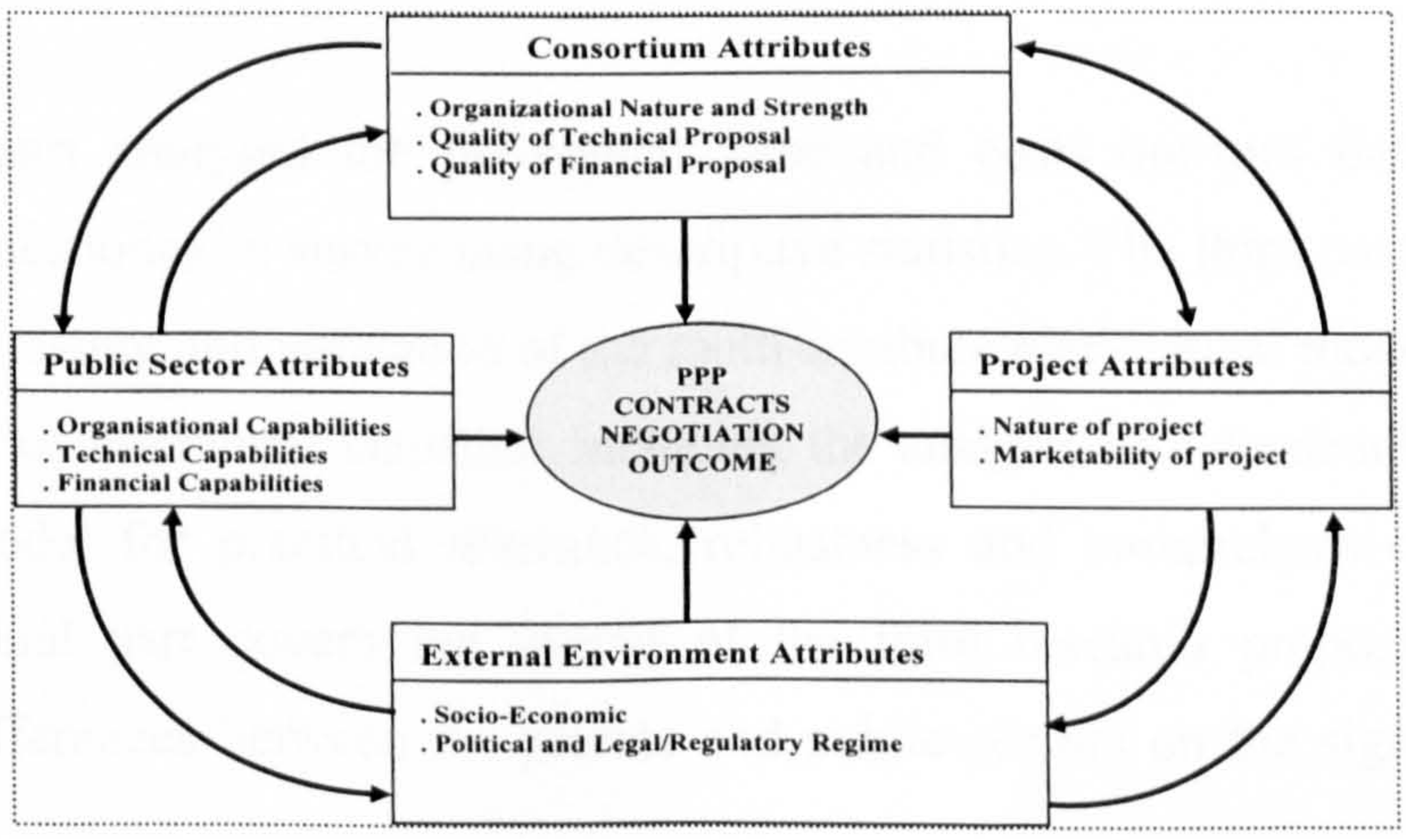



**Figure 6.1.1 PPP & Contract Negotiations: Outline of the Generic Model**

The research propositions are also hereby restated:

a) The twin problems of pre-contract time and cost overruns are real in the PPP infrastructure procurement and therefore remain a serious issue to be addressed if the philosophy is to gain general acceptance among all stakeholders.

b) A generic model can be developed to capture in a hierarchical order of significance the key attributes that positively influence the efficient and effective implementation of the negotiations phase of the PPP procurement process in terms of minimising times and cost overruns to the parties.

c) Though there is a broad agreement between the key stakeholders (the public and private sectors), on the relative significance of the main attributes of the Consortium, the Public Sector Client, the Project, and the External Environment on the outcome of the PPP contract negotiations, differences do exist amongst them on the underlying dimensions to these main influence centres".

*Negotiation outcome* in this research refers to time and cost efficiency during the pre-contract stages of the PPP procurement, where efficiency relates to the ability of the parties to minimise and/or eliminate unnecessary time and cost overruns and yet strive to conclude the deals in a satisfactory manner in terms of obtaining value for money.

This chapter has therefore been structured into four main parts. The first part deals with the analysis of the general information provided by the respondents on themselves as to their levels of experience in the procurement of infrastructure projects using the PPP/PFI strategy. This part also covers the profile of the projects used in the research analysis.

The second part analysed the pre-contact time and costs out-turn data obtained through the questionnaire survey using descriptive statistics. The third part covers the development, testing and validation of the multi-attribute hierarchical model based on the principles of inferential statistics, including the analysis of a feedback survey to assess the model for practical relevance, robustness and comprehensiveness. The fourth and final part covers the testing of the third research proposition – the perceptual differences between the private and public sectors on the significance of the attributes.

## 6.2 General information on respondents and the analysed projects

### 6.2.1 Profile of Respondents

Part 1 of the questionnaire was structured to gather general information on the respondents. The list of respondents was drawn from a database compiled by Centaur in collaboration with Her Majesty's Treasury (Centaur, 2002). This database contains a comprehensive listing of the names of top ranking firms, financial institutions, public sector clients and individual experts involved in project procurement using the PPP/Private Finance strategy including the list of PPP/PFI projects they were involved in.

In all 300 questionnaires were sent out to the individual experts between May and June 2002. These experts were selected primarily on the basis of their names being attached to concluded deals either as project managers, legal, technical or financial advisers, out of which 62 were returned representing a response rate of 21%. As a check for non-response bias, the response rate for this study compares favourably with the level of responses obtained for other UK wide research in the area of the PPP. Bing Li *et al.*, (2002) reported 12% rate (61 out of 500) for their research on Risk Management in PPP and 9.9% (68 of 700) for the Institute for Public Policy Research's (IPPR) call of evidence for consultations on the PPP.

Out of the 62 responses received the questionnaire for 49 of them were found adequately completed for detail analysis. The others were either not fully completed or returned uncompleted with an indication that information they had were of commercial confidentiality. Twenty five (25) of the fully completed responses came from respondents within the private sector and remaining twenty four (24) came from respondents who either work directly within the public sector or acted as advisers or consultants to the public sector for the specific projects that they provided their responses on.

Table 6.2.1 overleaf provides an overview of the respondents and their levels of experience in procuring infrastructure projects using the PPP/PFI strategy or delivery method.

**Table 6.2.1: General Profile of Respondents**

| Category of Respondents | Experience (av. no of PPP/PFI tenders) | Sector Representation | | Sub Total |
|---|---|---|---|---|
| | | Private | Public | |
| Chief Executive/M.D. | 7 | 3 | 3 | 6 |
| Project Manager | 6 | 11 | 12 | 23 |
| Legal Adviser | >10 | 1 | 0 | 1 |
| Financial Adviser | 9 | 3 | 6 | 9 |
| Property Adviser | >10 | 0 | 2 | 2 |
| Senior Lender | >10 | 1 | 0 | 1 |
| Cost Adviser | >10 | 1 | 0 | 1 |
| Architect | >10 | 1 | 0 | 1 |
| Engineer | 8 | 1 | 0 | 1 |
| Technical Adviser | 4 | 0 | 1 | 1 |
| Planning Adviser | 6 | 1 | 0 | 1 |
| Bid Manager | 10 | 1 | 0 | 1 |
| Project Director | >10 | 1 | 0 | 1 |
| **Overall Total** | | **25** | **24** | **49** |

Figure 6.2.1 gives a pictorial representation of the general profile of the respondents.

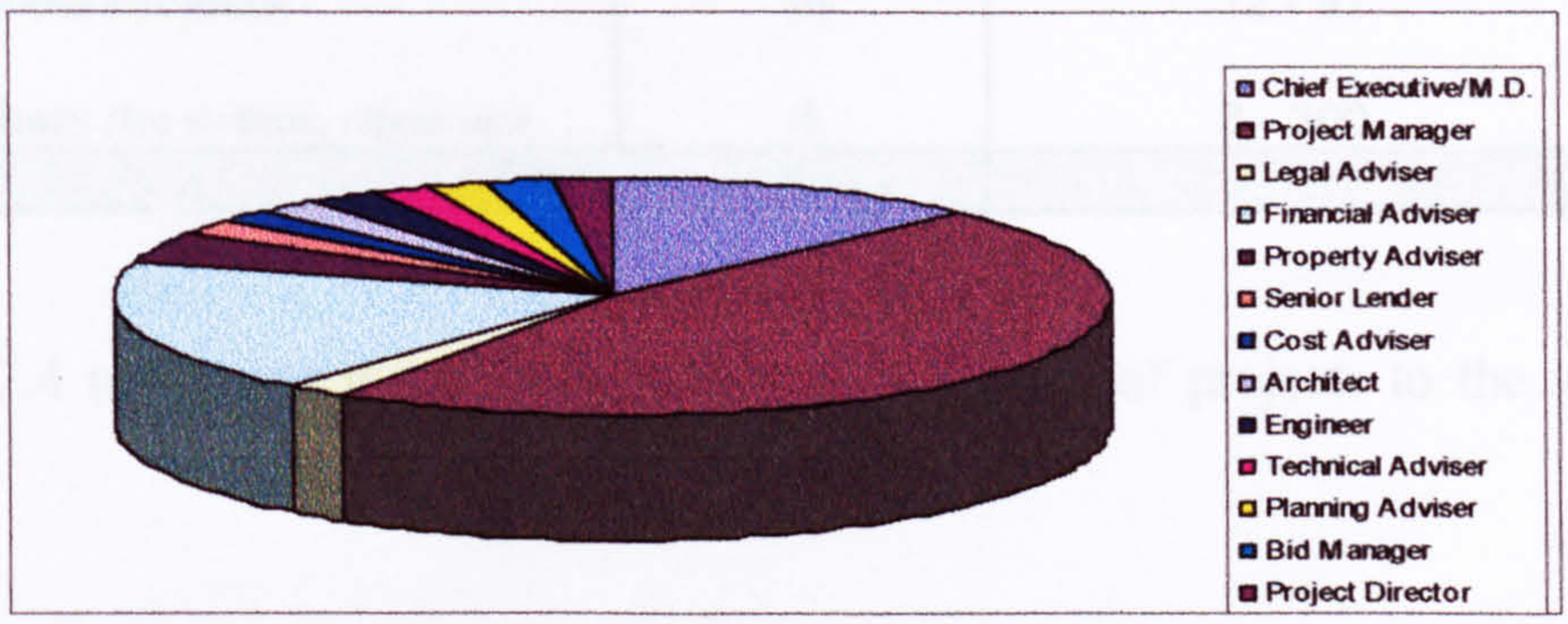



**Figure 6.2.1 General Profile of Respondents**

To facilitate the analysis of the third objective of the research – the assessment of the perceptual difference in opinion between the private and public sectors on the relative significance of the identified attributes on the outcome of the PPP negotiation process, the respondents were further re-profiled into two main categories as shown in Table 6.2.1 and Figures 6.2.2 and 6.2.3

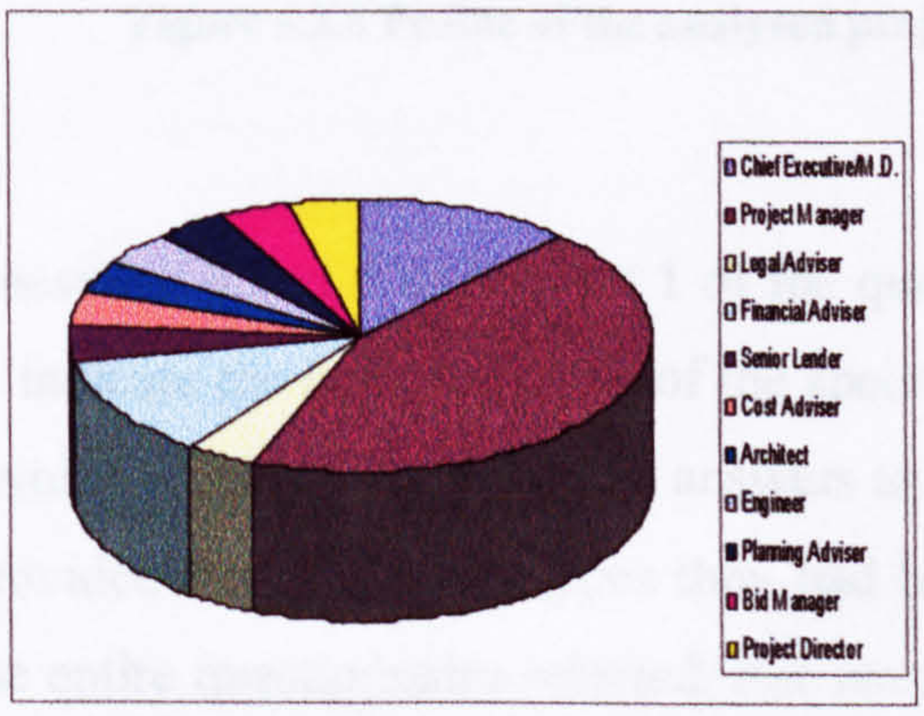



**Figure 6.2.2 Profile of Private Sector Respondents**

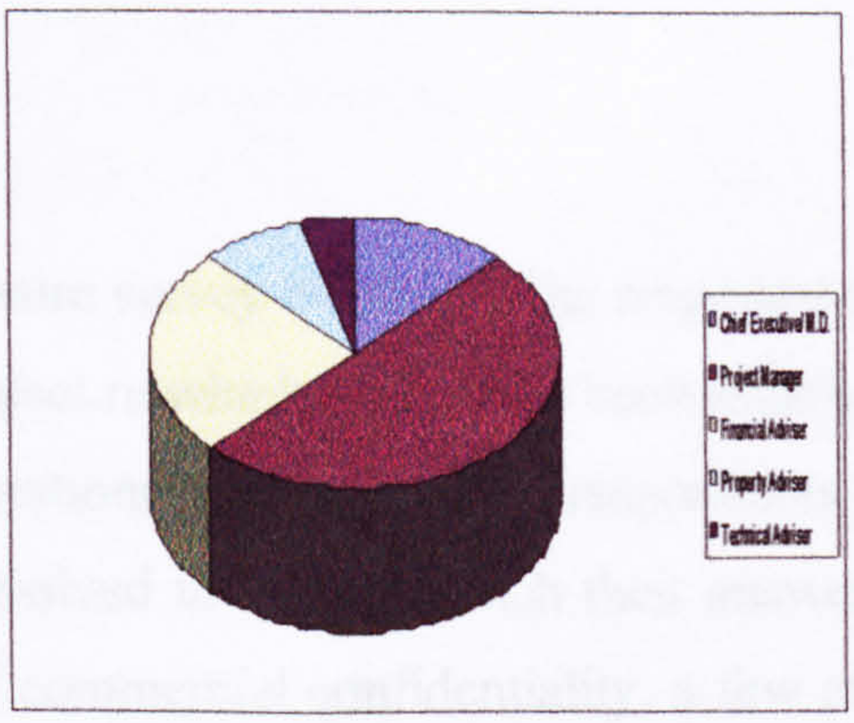



**Figure 6.2.3 Profile of Public Sector Respondents**

Specific project data were collected through the questionnaire survey on concluded PPP projects that have been taken through the procurement stages up to the signing of contracts and/or at construction and operation phases. Table 6.2.2 gives the profile of the categories of projects analysed.

**Table 6.2.2 General profile of analysed projects**

| Project Type | No of projects Analysed | Range of Capital Value *(£m)* |
|---|---|---|
| Civil Engineering Projects | 13 | 25 -1300 |
| Hospital Projects | 14 | 30 -300 |
| School Projects | 18 | 12 - 91 |
| Others (fire stations, offices,etc) | 4 | 8 - 300 |
| ***Total*** | 49 | |

Figure 6.2.4 represents the proportion of each category of projects to the analysed total.

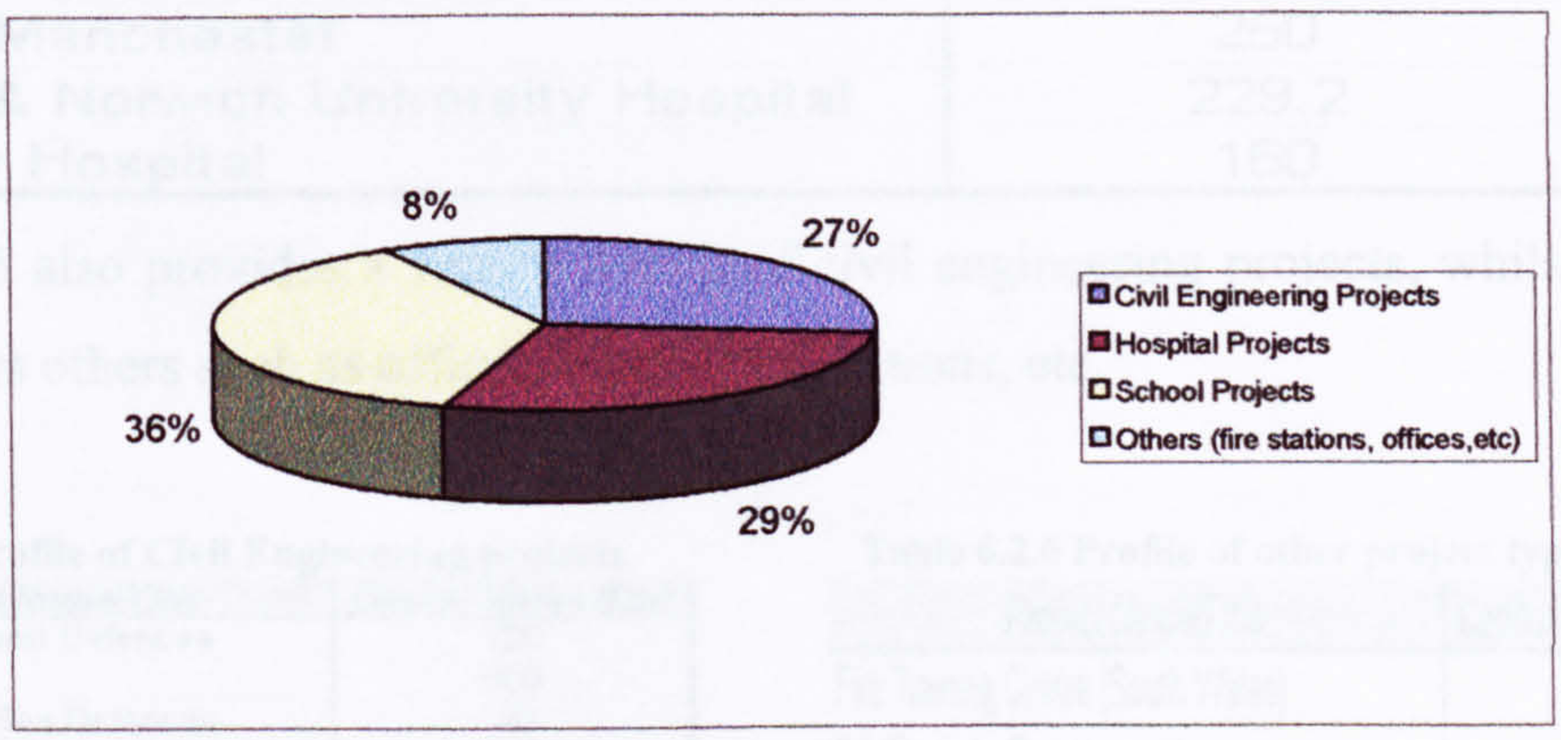



**Figure 6.2.4 Profile of the analysed projects**

Questions 4 and 5 under Part 1 of the questionnaire survey employed the respondent to indicate the type and name of the specific project in which he/she had been mainly involved and for which his/her answers to the questionnaire applied. The respondents provided the names and types they had been involved in and for which their answer the entire questionnaire referred. For reasons of commercial confidentiality, a few of them declined to provide the capital value and/or the bidding costs of the projects.

Tables 6.2.3 and 6.2.4 respectively list educational/school projects and health sector projects for which the respondents made specific data available.

**Table 6.2.3 Profile of Education/School projects**

| *Project Name/Title* | *Capital Value (£m)* |
|---|---|
| Peacehaven Schools | 18 |
| Edinburgh Schools Partnership | 85 |
| Birmingham 10 Schools PPP | 40 |
| Falkirk Schools | 70 |
| Parrs Wood School | 12 |
| Aberdeeshire Schools | 24 |
| Caerphilly Secondary Schools | 25 |
| Tower Hamlet Group of Schools | 52 |
| Investing in Education | 91 |
| FE College | 20 |
| Grouped Schools Project | 35 |
| YSGOL GYFUN PENNEDDIN | 12 |
| A New Way Forward (Fife Council) | 40 |
| West Lothian Schools PPP | 27 |

**Table 6.2.4 Profile of Health Sector project**

| *Project Name/Title* | *Capital Value (£m)* |
|---|---|
| HOCLAS | 200 |
| New Royal Infirmary, Edinburgh | 215 |
| Chester Le Street Community Hospital | n/a |
| Dudley Group of Hospitals | 140 |
| Stoke Maideville Hospital | 30 |
| Central Manchester | 250 |
| Norfolk & Norwich University Hospital | 229.2 |
| Bromley Hospital | 160 |

Table 6.2.5 also provides a similar listing of civil engineering projects, whilst Table 6.2.6 covers others such as offices, courts, fire stations, etc.

**Table 6.2.5 Profile of Civil Engineering projects**

| *Project Name/Title* | *Capital Value (£m)* |
|---|---|
| Broadlands Flood Defences | 120 |
| M6 Toll Road | 500 |
| Pevesey Bay Sea Defences | 30 |
| Moray Coast Wastewater Project | 60 |
| Sky Bridge | 95 |
| Birmingham Highway PFI | 1300 |
| Tyne & Wear Metro Extension | 98 |
| Metrolink | 600 |

**Table 6.2.6 Profile of other project types**

| *Project Name/Title* | *Capital Value (£m)* |
|---|---|
| Fire Training Centre (South Wales) | 8 |
| P4 (Property Development) | 100 |
| Central London Accommodation (Home Office) | 300 |
| Office Building (Cambridge) | 20 |

In order to find out how representative the analysed projects were to the population of PPP/PFI projects nationwide, a comparison has been drawn using data provided by the Bank of Scotland called The PFI Map of Great Britain 2002 which listed all the signed PPP/PFI projects within the UK by the end 2001. This national data was compiled by the Bank in association with the Office of Government Commerce and

Centaur, the publishers of ***The PFI Report.*** Table 6.2.7 provides an indication of this representation.

**Table 6.2.7 Proportion of analysed projects to signed PPP/PFI projects UK wide**

| Project Category | Used in the Research Analysis | | Signed PPP/PFI Projects up to 2001* | | % of analysed projects to the signed ones |
|---|---|---|---|---|---|
| | No analysed | Capital Value (£m) | Total no | Capital Value (£m) | |
| Civil Engineering Projects | 13 | 25-1300 | 37 | 5-4178 | 35 |
| Health Projects | 14 | 30-300 | 103 | 3-404 | 14 |
| School Projects | 18 | 12-91 | 38 | 0.2-127 | 47 |
| Others (fire stations, offices,courts, housing, prisons, police stations) | 4 | 8-300 | 62 | 7-164 | 6 |
| ***Total*** | 49 | | 240 | | 20 |

** Data source: Bank of Scotland (The PFI map of Great Britain 2002)*

Figure 6.2.5 gives an indication of the percentage of the analysed projects to signed PPP/PFI projects nationwide.

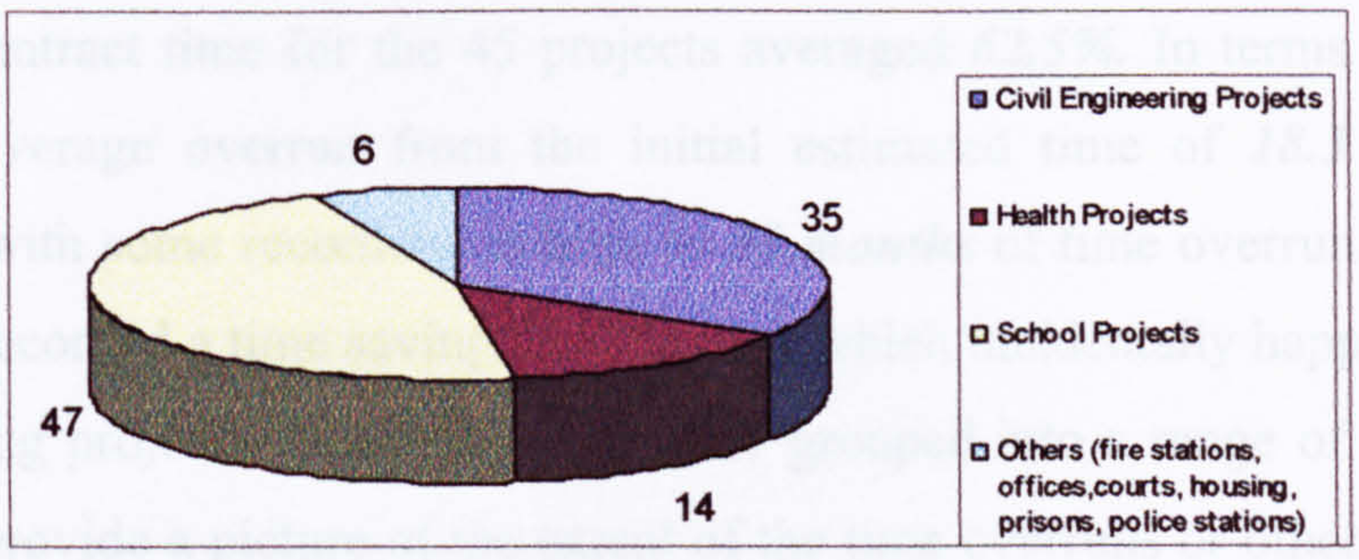



**Figure 6.2.5 Percentage of analysed projects to signed PPP/PFI projects UK wide**

The national data contained signed PPP/PFI contracts since the inception of the concept in 1992 to the end of 2001. Although the national data has other non-infrastructure based projects such as waste management and IT provisions, the above comparison considered only infrastructure-based projects since the focus of this research is purely on the infrastructure-based contracts. Twenty percent (20%) is quite a representative sample of the population.

## 6.3 Analysis of pre-contract Time and Cost Out-turns

### 6.3.1 Pre-contract Time Out-turns

This section of the analysis seeks to investigate the extent of pre-contract time overruns when the PPP philosophy is used in procuring services through infrastructure projects. Delays resulting in spiralling bidding costs during the pre-contract stages have frequently been cited as a problem in the implementation of this philosophy. The analysis is principally based on descriptive statistics using the data provided by the respondents. On the time out-turns, Questions 7 and 8 of Part 1 of the questionnaire sought information on specific projects as to the original indicative time schedule provided by the client organisations in the invitations to bid. This should be the date of the OJEC Notice/Advert to the date when the deals were supposed to have been concluded and the contracts signed. This period is referred to in the research as the pre-contract time period.

In all, data on a total of forty-five (45) projects were analysed. The overall overrun in the pre-contract time for the 45 projects averaged ***62.5%.*** In terms of months, there was an average overrun from the initial estimated time of ***18.3 months to 28.5 months,*** with some recording as high as ***38 months*** of time overrun. Only one of the projects recorded a time saving of 3 months, which incidentally happened to be a civil engineering project. The data was further grouped into a range of time out-turns in order to provide a picture of the extent of the time overruns or otherwise. Table 6.3.1 provides a representation of the time out-turns in terms of percentage variances. The complete detail of the data is shown in Appendix B.1.

**Table 6.3.1 Pre-contract time Out-turns (%)**

| % Pre-contract Time Variance | Projects | |
|---|---|---|
| | no of projects | % of total |
| < 0 | 1 | 2 |
| 0 - 20 | 8 | 18 |
| 21 - 40 | 5 | 11 |
| 41 - 60 | 18 | 40 |
| 61 - 80 | 6 | 13 |
| 81 - 100 | 4 | 9 |
| >100 | 3 | 7 |
| Total | 45 | 100 |

In order to have a feel of the data in terms of absolute values, it was further grouped into ranges of the time out-turns in months. This is represented by Table 6.3.2 below.

**Table 6.3.2 Pre-contract Time Variance (months) – for all categories of projects**

| Pre-contract Time Variance (months) | Projects | |
|---|---|---|
| | *no of projects* | *% of total* |
| < 0 | 1 | 2 |
| 0 - 5 | 9 | 20 |
| 6 - 10 | 13 | 29 |
| 11 - 15 | 16 | 36 |
| 16 - 20 | 2 | 4 |
| 21 - 25 | 2 | 4 |
| 26 - 30 | 0 | 0 |
| 31 - 35 | 1 | 2 |
| 36 - 40 | 1 | 2 |
| Total | 45 | 100 |

Figures 6.3.1 and 6.3.2 provide a pictorial representation of this pre-contract time trend.

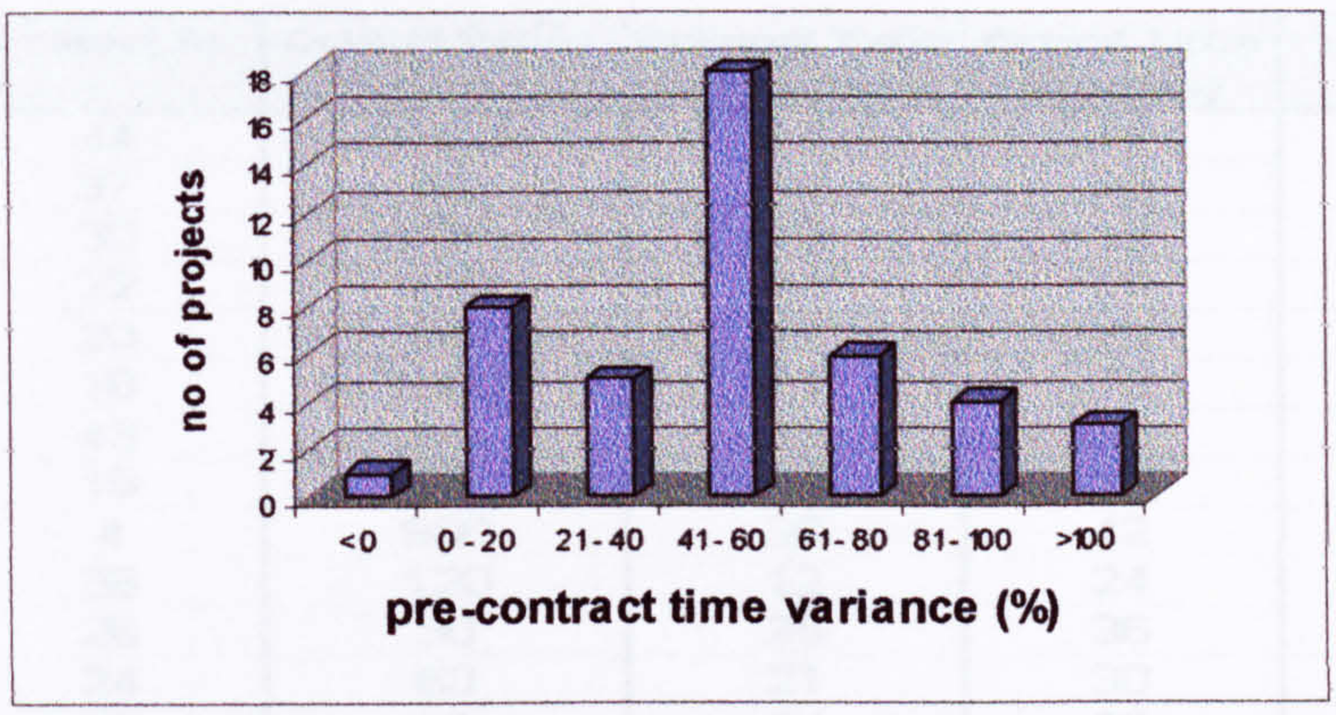



**Figure 6.3.1 Pre-contract time variances (%) – for all categories of projects**

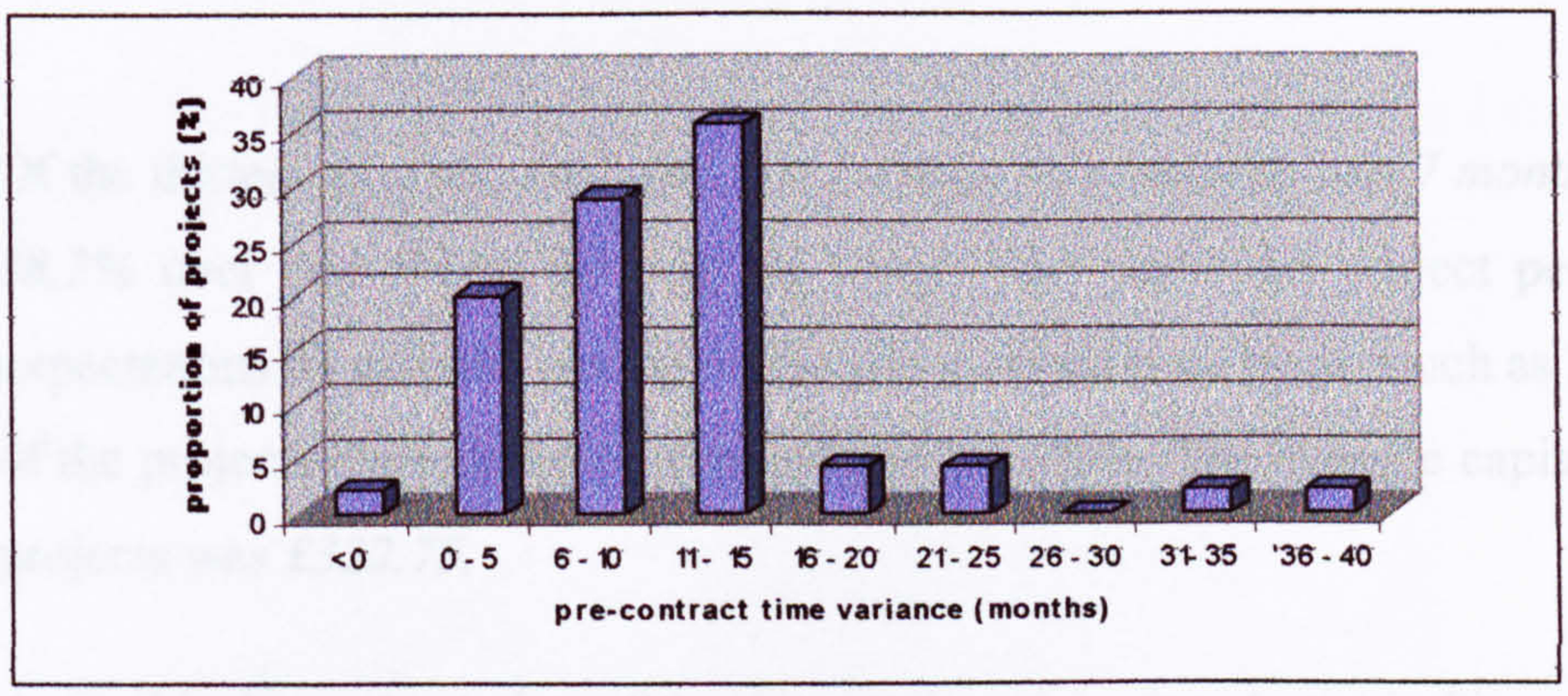



**Figure 6.3.2 Pre-contract time variance (months) – for all categories of projects**

The data was further regrouped into three major sectors – schools or educational facilities, hospital or health facilities and major civil engineering projects, with a minor group comprising a small number for fire stations, courts, offices, etc, termed as others. The idea was to find out how each of these sectors performed. This may help highlight some of the underlying reasons behind why some sectors perform better than the others.

### *6.3.1.1 Civil Engineering projects*

Data for thirteen (13) projects of civil engineering nature were analysed. The projects consisted of rail and road transport infrastructure, waste disposal plants, water and sewage systems, and major flood and sea defence works. The pre-contract procurement time out-turns for these projects are as represented in Table 6.3.3.

**Table 6.3.3 Pre-contract Time Out-turns for Civil Engineering projects**

| Project ID | Capital Value (£m) | Original Time (months) | Actual Time (months) | Variance (%) |
|---|---|---|---|---|
| 44 | 1000 | 12 | 18 | 50.0 |
| 37 | 50 | 18 | 20 | 11.1 |
| 30 | 300 | 12 | 12 | 0.0 |
| 22 | 200 | 24 | 27 | 12.5 |
| 20 | 25 | 12 | 24 | 100.0 |
| 18 | 1300 | 15 | 18 | 20.0 |
| 43 | n/a | 18 | 30 | 66.7 |
| 16 | 98 | 15 | 12 | -20.0 |
| 4 | 600 | 30 | 42 | 40.0 |
| 36 | 120 | 12 | 24 | 100.0 |
| 26 | 30 | 25 | 36 | 44.0 |
| 24 | 60 | 21 | 30 | 42.9 |
| 10 | 90 | 24 | 36 | 50.0 |
| **Average** | **322.75** *n=12* | **18** *n=13* | **25** *n=13* | **38.2** *n=13* |

Of the thirteen projects analysed, the average time overrun was *7 months* representing ***38.2%*** over and above the original times. One particular project performed above expectations by actually saving on the pre-contract time by as much as 20%. Only two of the projects exceeded their time targets by 100%. The average capital value for the projects was ***£322.75.***

A graphical representation of the time variances is also shown in Figure 6.3.3

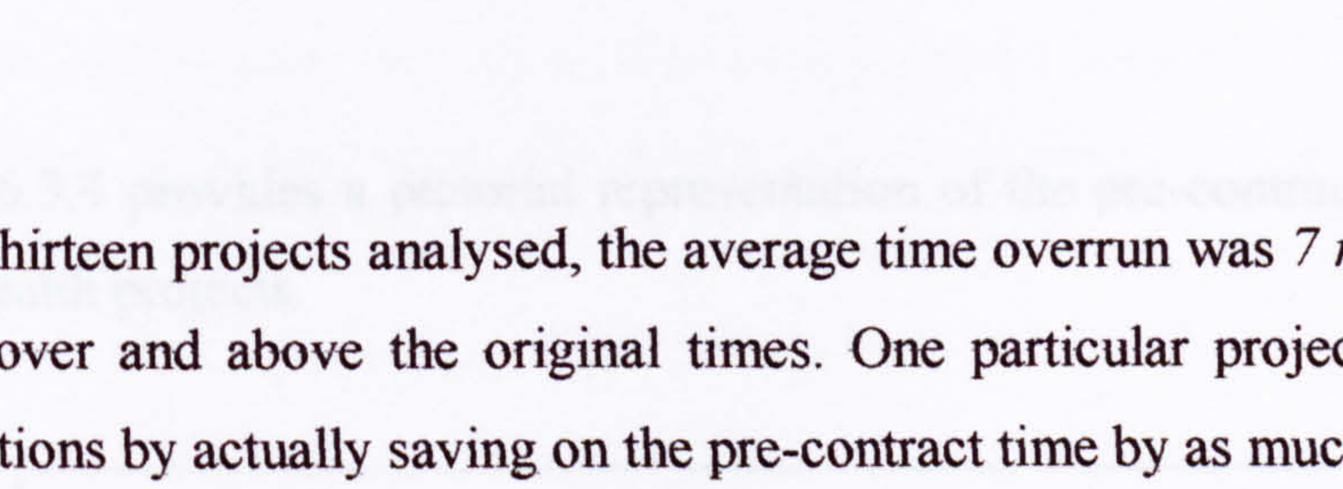



**Figure 6.3.3 Pre-contract time out-turns for civil engineering projects**

### *6.3.1.2 Health/Hospital projects*

Pre-contract time data for twelve (12) health projects were analysed. None of the projects showed any savings in time. The average time overrun was ***10 months*** over an average of 20 months of estimated planned pre-contract procurement time – a ***50%*** average overrun for projects of average capital value of ***£166.3m***. One of the projects had time overrun of 18 months, which was 100% of the original time.

**Table 6.3.4 Pre-contract time out-turns for Health projects**

| Project ID | Capital Value (£m) | Original Time months | Actual Time months | Variation (%) |
|---|---|---|---|---|
| 50 | 200 | 24 | 36 | 50.0 |
| 49 | 50 | 21 | 30 | 42.9 |
| 40 | 200 | 18 | 24 | 33.3 |
| 33 | n/a | 18 | 24 | 33.3 |
| 31 | 140 | 21 | 33 | 57.1 |
| 19 | 300 | 18 | 21 | 16.7 |
| 15 | 100 | 9 | 15 | 66.7 |
| 13 | 30 | 27 | 40 | 48.1 |
| 12 | 250 | 24 | 34 | 41.7 |
| 3 | 229.2 | 18 | 30 | 66.7 |
| 2 | 160 | 18 | 36 | 100.0 |
| 1 | 170 | 24 | 36 | 50.0 |
| **Average** | **166.3** n=11 | **20.0** n=12 | **29.9** n=12 | **50** n=12 |

Figure 6.3.4 provides a pictorial representation of the pre-contract time out-turns for these health projects.

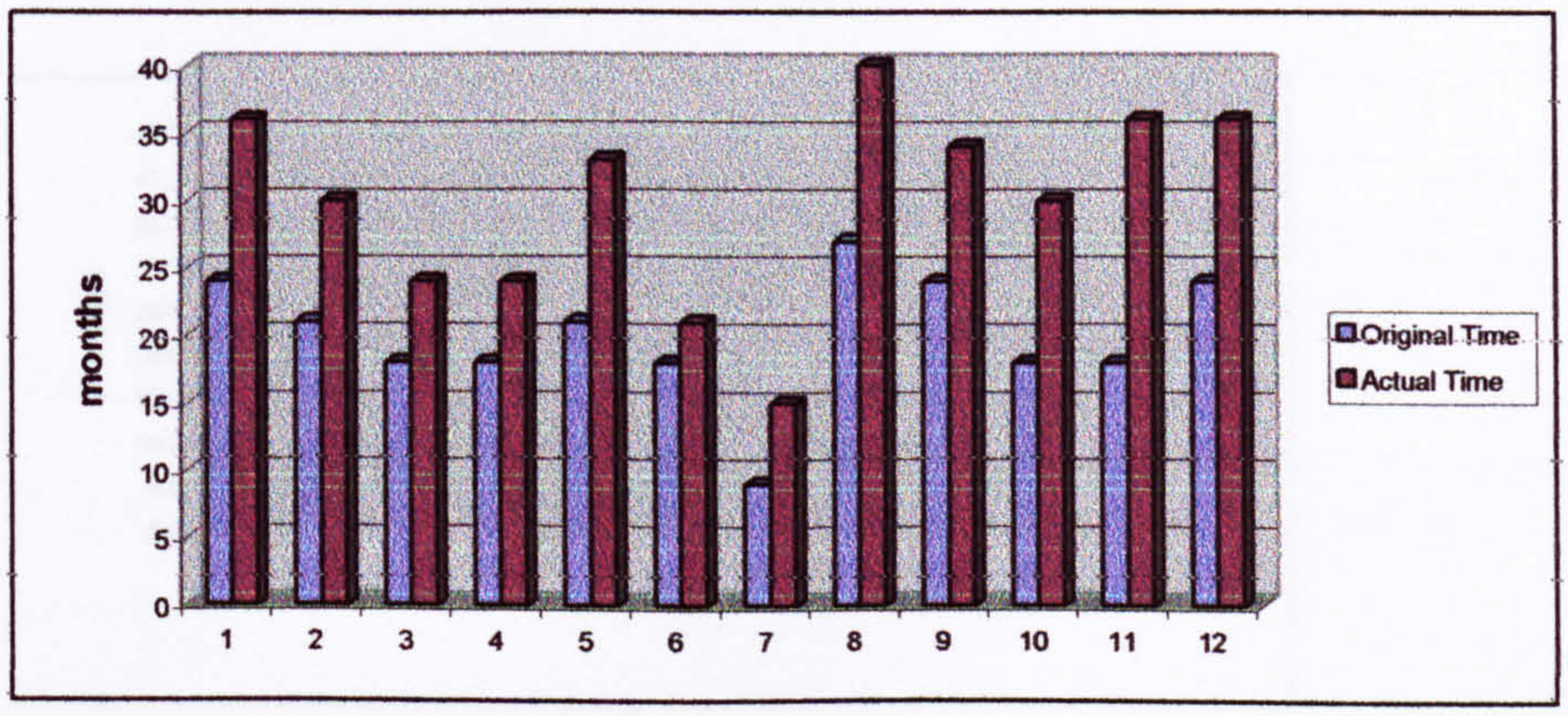



**Figure 3.3.4 Pre-contract time out-turns for health projects**

### *6.3.1.3 Educational/School projects*

Sixteen of the valid data returned contained information on the pre-contract time out-turns for educational/school projects. The analysed data revealed a rather high percentage of time overruns for projects procured within this sector. The average overrun was ***64%*** despite the fact that the average capital value is much smaller – ***£43.5***. The average time overrun in terms of months was ***10.5 months.*** One of the projects recorded as high as 344% overrun.

**Table 6.3.5 Pre-contract time out-turns for educational/school projects**

| Project ID | Capital Value (£m) | Original Time months | Actual Time months | Variation (%) |
|---|---|---|---|---|
| 47 | 85.0 | 8.0 | 12.0 | 50.0 |
| 46 | 40.0 | 26.0 | 36.0 | 38.5 |
| 45 | 70.0 | 9.0 | 13.0 | 44.4 |
| 42 | 75.0 | 24.0 | 24.0 | 0.0 |
| 41 | 37.0 | 18.0 | 36.0 | 100.0 |
| 35 | n/a | 12.0 | 21.0 | 75.0 |
| 34 | 24.0 | 12.0 | 25.0 | 108.3 |
| 32 | 25.0 | 15.0 | 26.0 | 73.3 |
| 28 | 52.0 | 9.0 | 40.0 | 344.4 |
| 27 | 91.0 | 24.0 | 36.0 | 50.0 |
| 23 | 20.0 | 18.0 | 39.0 | 116.7 |
| 14 | 35.0 | 24.0 | 36.0 | 50.0 |
| 9 | 12.0 | 12.0 | 18.0 | 50.0 |
| 8 | 40.0 | 15.0 | 24.0 | 60.0 |
| 6 | 20 | 18.0 | 24 | 33.3 |
| 5 | 27 | 18 | 20 | 11.1 |
| **Average** | **43.5** *n=15* | **16.4** *n=16* | **26.9** *n=16* | **64** *n=16* |

The educational sector projects tend to be aggregation of projects comprising in some instances some four to six schools with a mix of new-build and rehabilitation. Each of these schools may have their own unique peculiarities. The analysed data for the educational/school projects is shown in Figure 6.3.5

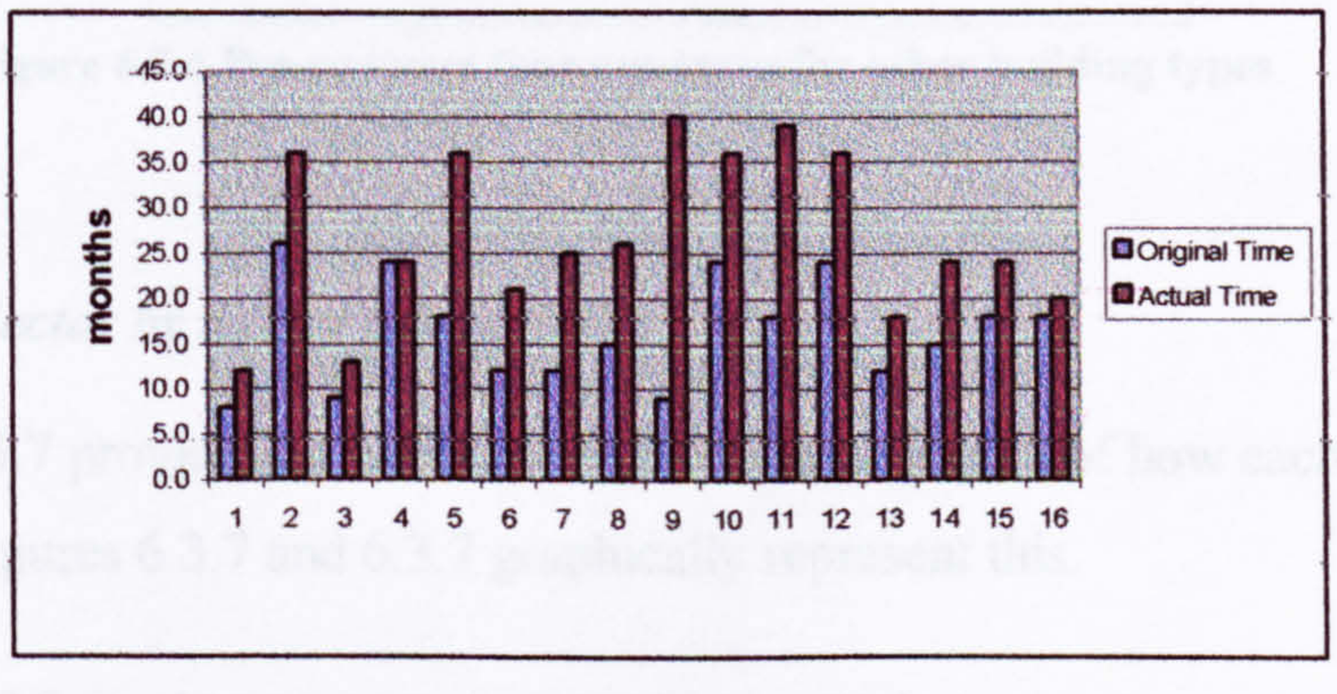



**Figure 6.3.5 Pre-contract time out-turn for educational/school projects**

### *6.3.1.4 Others (offices, courts, fire stations, etc)*

Data was also obtained for a number of projected which could not be clearly delineated into any of the three main categories. These were grouped together as 'others'. Table 3.3.6 provides an indication of how they performed in term the pre-contract time outturns. One of the projects also recorded a rather high outturn.

**Table 6.3.6 Pre-contract time out-turns for others project types**

| Project ID | Capital Value (£m) | Original Time (months) | Actual Time (months) | Variance (%) |
|---|---|---|---|---|
| 21 | 8 | 24 | 36 | **50.0** |
| 17 | 100 | 12 | 18 | **50.0** |
| 11 | 300 | 36 | 60 | **66.7** |
| 7 | 20 | 12 | 50 | **316.7** |
| **Average** | **107** *n=4* | **21** *n=4* | **41** *n=4* | **121** *n=4* |

The pre-contract time out-turns for the other building types are represented in Figure 6.3.6 below.

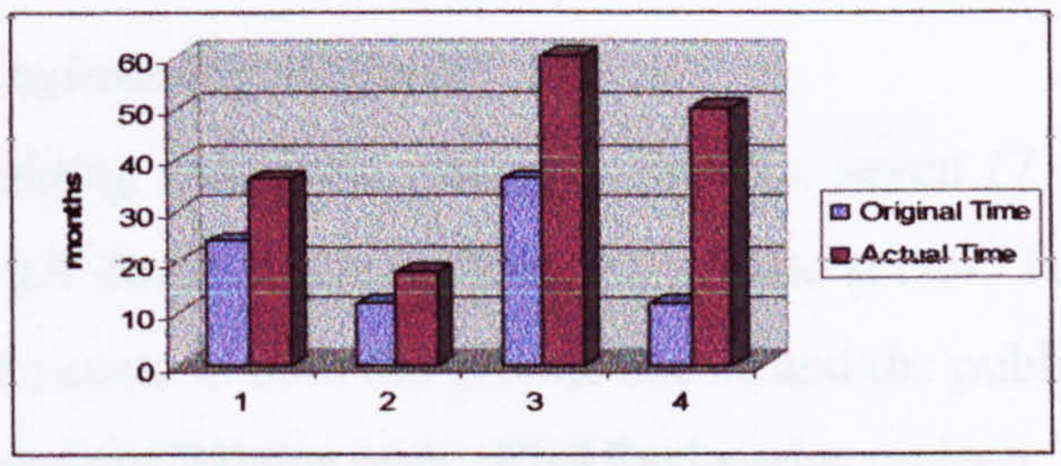



**Figure 6.3.6 Pre-contract time out-turns for other building types**

### *6.3.1.5 Sector by Sector Comparison*

Table 6.3.7 provides an overview of the data in respect of how each sector performed, whilst Figures 6.3.7 and 6.3.7 graphically represent this.

**Table 6.3.7 Sector by sector pre-contract time comparison**

| Sector | Capital Value (£m - av) | Original Time (months - av) | Actual Time (months - av) | Variance (%) |
|---|---|---|---|---|
| Civil En'g | 322.75 | 18.3 | 25.3 | **38** |
| Health | 166.3 | 20.0 | 29.9 | **50** |
| Schools | 43.5 | 16.4 | 26.9 | **64** |

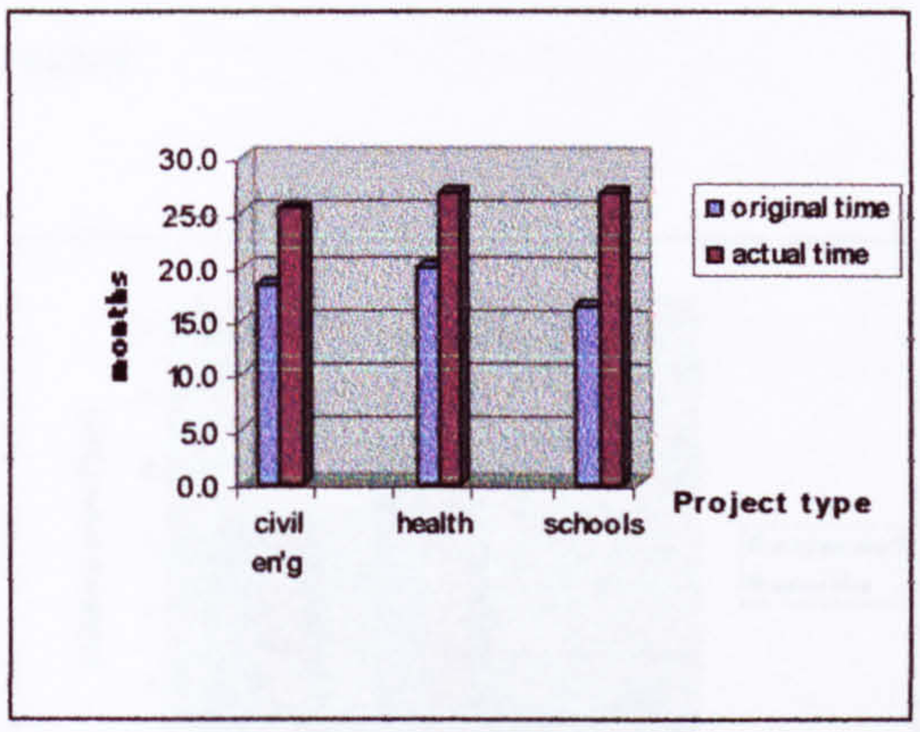



**Figure 6.3.7 Sector by sector comparison of pre-contract time outturns**

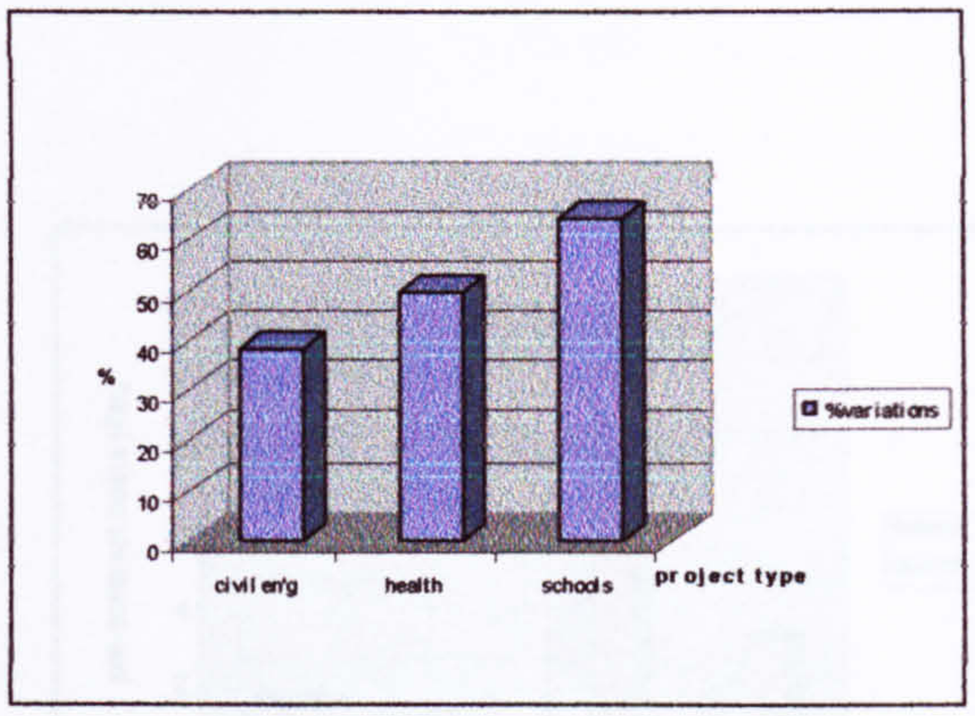



**Figure 6.3.8 Percentage variance in pre-contract time outturn for each sector**

### 6.3.2 Pre-contract/Bidding Cost Out-turns

Questions 9 and 10 sought information from the respondents on initial estimated direct pre-contract/bidding cost to the organisation represented in respect of the specific project. A comprehensive listing of the pre-contract/bidding cost out-turns as provided by the respondents is included in this report as Appendix B.2.

#### *6.3.2.1 Civil Engineering Projects*

Pre-contract/bidding cost data was provided for seven (7) of the civil engineering projects of which three (3) came from the private sector. Table 6.3.8 below gives an indication of the costs to both the private sector and the public sector.

**Table 6.3.8 Pre-contract/Bidding costs – Civil Engineering projects**

| Project Category | Project ID | Capital Value (£m) | Pre-contract/Bidding Cost Out-turns | | | | Sector |
|---|---|---|---|---|---|---|---|
| | | | original (£m) | actual (£m) | variation (£m) | % variation | |
| civil eng | 30 | 300 | 6 | 6 | 0 | ***0*** | private |
| | 18 | 1300 | 1.25 | 1.25 | 0 | ***0*** | public |
| | 16 | 98 | 1 | 0.5 | -0.5 | ***-50*** | public |
| | 4 | 600 | 8 | 11 | 3 | ***37.5*** | public |
| | 36 | 120 | 0.5 | 1 | 0.5 | ***100.00*** | private |
| | 26 | 30 | 0.5 | 1 | 0.5 | ***100.00*** | private |
| | 24 | 60 | 1.5 | 3 | 1.5 | ***100.00*** | public |

Figure 6.3.9 shows how the bidding costs incurred by the private sector varied over the duration of the bidding process mainly as a result of the time overruns due to the

protracted negotiations. Figure 6.3.10 also indicates similar variations for the public sector.

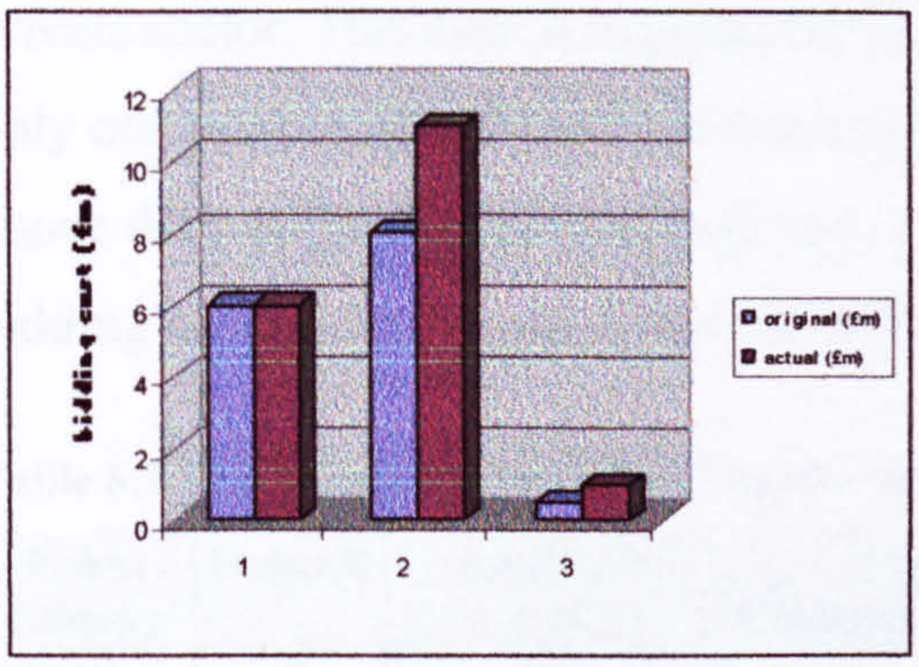



**Figure 6.3.9 Private sector bidding cost – Civil Engineering projects**

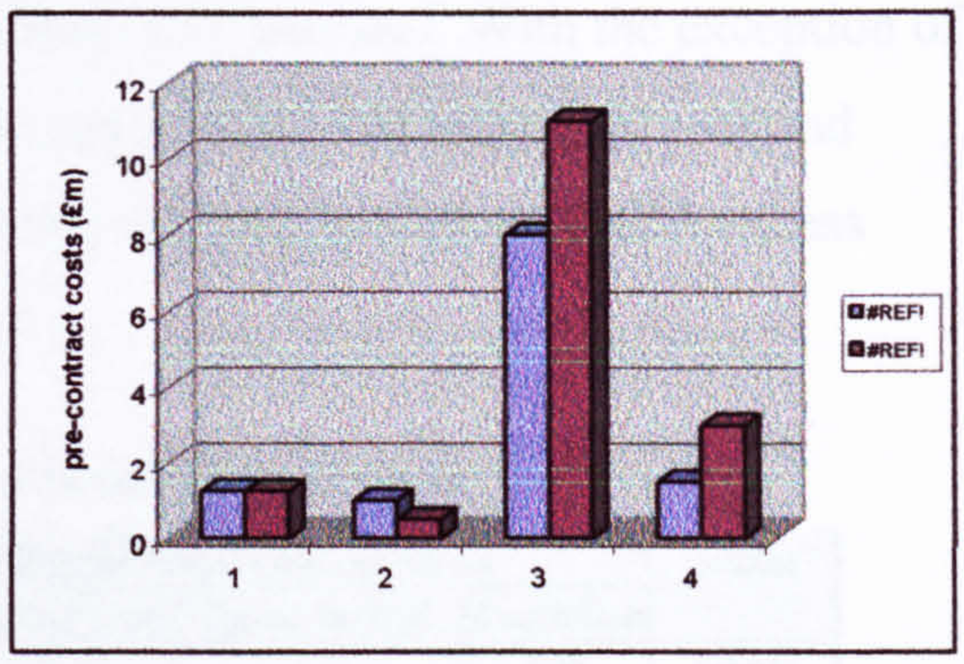



**Figure 6.3.10 Public sector pre-contract costs – Civil Engineering projects**

### *6.3.2.2 Health Sector Projects*

Nine (9) pre-contract/bidding cost data was provided for health sector projects as indicated in the Table 6.3.9. Out of the nine projects the private sector provided its bidding costs for seven (7) of the projects whilst the public sector provided pre-contract costs for two.

**Table 6.3.9 Private Sector Bidding Costs – Health sector projects**

| Project Category | Project ID | Capital Value (£m) | Pre-contract/Bidding Cost Out-turns | | | | Sector |
|---|---|---|---|---|---|---|---|
| | | | original (£m) | actual (£m) | variation (£m) | % variation | |
| health | 50 | 200 | 2 | 3 | 1 | ***50*** | private |
| | 49 | 50 | 0.25 | 0.75 | 0.5 | ***200*** | private |
| | 40 | 200 | 0.4 | 0.5 | 0.1 | ***25*** | public |
| | 33 | n/a | 0.1 | 0.1 | 0 | ***0*** | private |
| | 15 | 100 | 0.28 | 0.3 | 0.02 | ***7.1*** | private |
| | 13 | 30 | 0.39 | 0.6 | 0.21 | ***53.8*** | private |
| | 3 | 229.2 | 3 | 4.5 | 1.5 | ***50*** | public |
| | 2 | 160 | 1 | 2 | 1 | ***100*** | private |
| | 1 | 170 | 0.5 | 0.5 | 0 | ***0*** | prvate |

Figures 6.3.11 and 6.3.12 represent these costs to the private and public sectors.

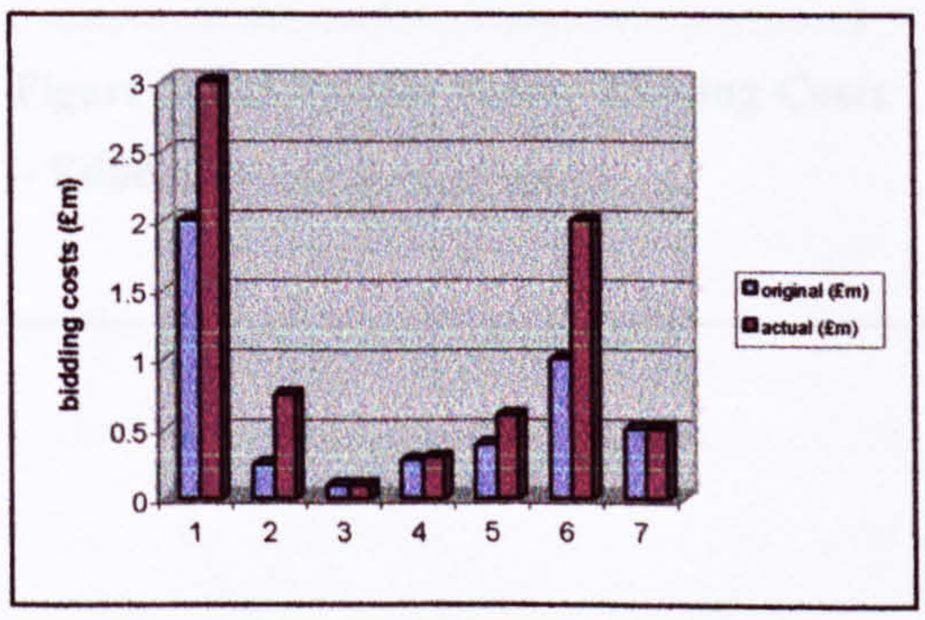



**Figure 6.3.11 Private Sector Bidding Cost – Health sector projects**

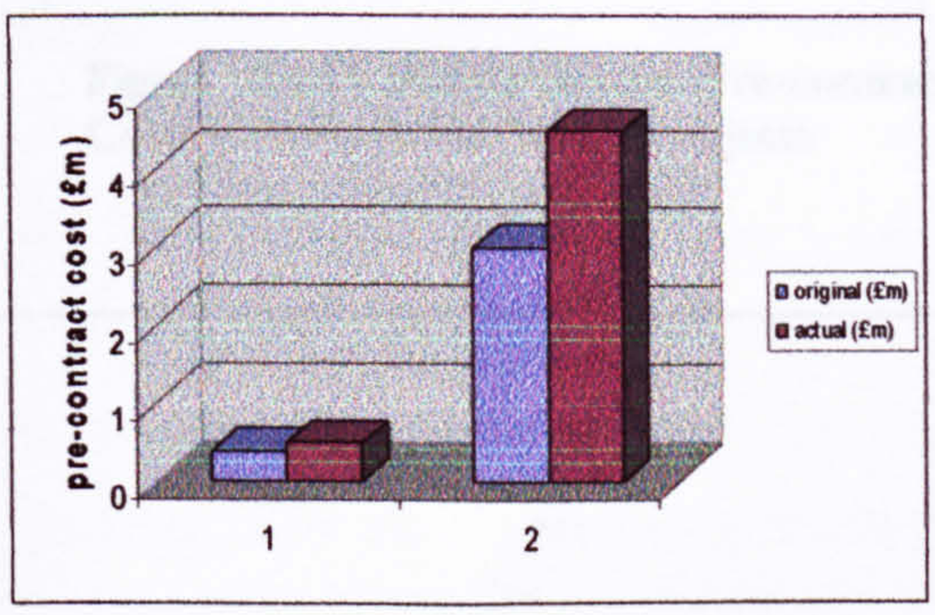



**Figure 6.3.12 Public Sector Pre-contract Costs – Health sector projects**

### *6.3.2.3 Educational/School Projects*

The largest data was returned for educational or school projects. In all, cost data was provided for thirteen (13) projects within this sector of which six came from the private sector. This data is represented in Table 6.3.10 overleaf. With the exception of only one project, all of them exhibited excess pre-contract/bidding costs over and above their original estimates with one of them recording as high as **133%** excess bidding cost to the private sector participant.

**Table 6.3.10 Pre-contract/Bidding Costs for Educational/School projects**

| Project Category | Project ID | Capital Value (£m) | Pre-contract/Bidding Cost Out-turns | | | | Sector |
|---|---|---|---|---|---|---|---|
| | | | original (£m) | actual (£m) | variation (£m) | % variation | |
| schools | 46 | 40.0 | 1.00 | 2.20 | 1.2 | ***120*** | private |
| | 45 | 70.0 | 0.20 | 0.40 | 0.2 | ***100*** | private |
| | 42 | 75.0 | 0.50 | 1.00 | 0.5 | ***100*** | public |
| | 41 | 37.0 | 1.85 | 3.70 | 1.85 | ***100*** | public |
| | 35 | n/a | 0.13 | 0.28 | 0.145 | ***111.5*** | private |
| | 34 | 24.0 | 0.8 | 1.20 | 0.4 | ***50*** | public |
| | 32 | 25.0 | 0.35 | 0.55 | 0.2 | ***57.1*** | public |
| | 28 | 52.0 | 0.6 | 1.40 | 0.8 | ***133.3*** | private |
| | 27 | 91.0 | 0.75 | 1.00 | 0.25 | ***33.3*** | public |
| | 14 | 35.0 | 0.4 | 0.7 | 0.3 | ***75*** | private |
| | 9 | 12.0 | 0.4 | 0.4 | 0 | ***0*** | public |
| | 8 | 40.0 | 1.19 | 1.2 | 0.01 | ***0.8*** | public |
| | 6 | 20 | 0.4 | 0.5 | 0.1 | ***25*** | private |

Figures 3.2.13 and 3.2.14 overleaf respectively provide a graphical representation of the data for the private and public sectors for the analysed educational/school projects.

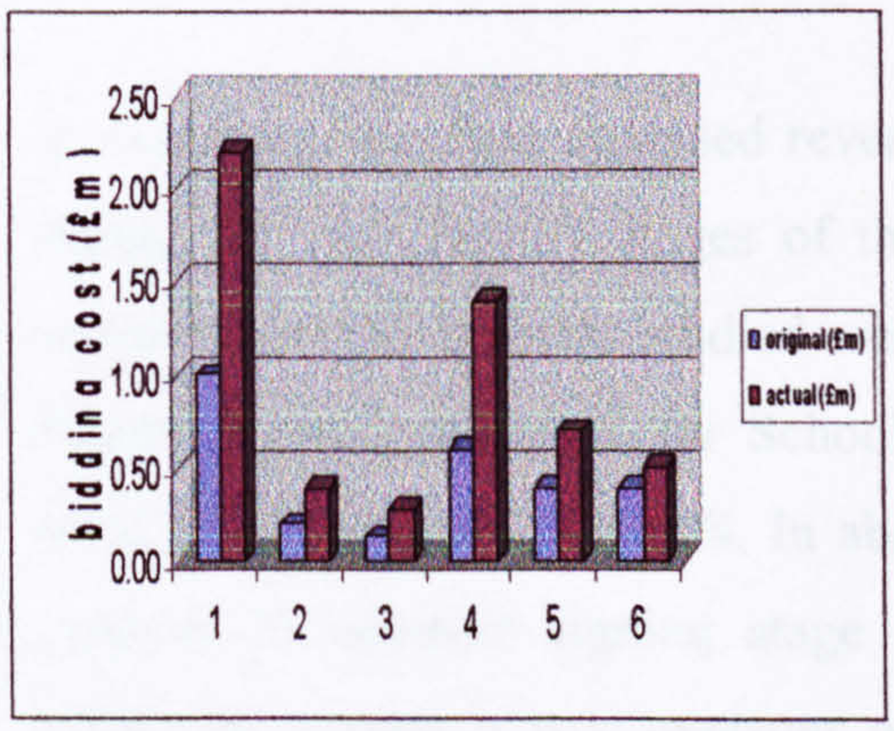



**Figure 3.3.13 Private Sector Bidding Costs – Educational/School projects**

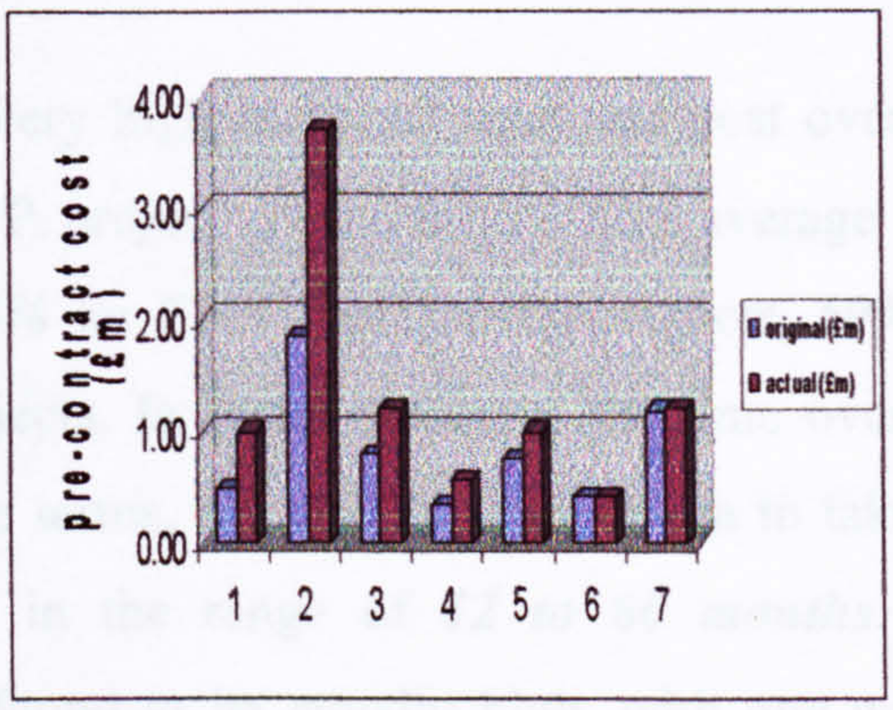



**Figure 3.3.14 Public sector Pre-contract Costs – Educational/School projects**

***6.3.2.3.4 Others (offices, courts, fire stations, etc)***

The pre-contract/bidding cost data was provided for three other projects within this category, details of which are provided in Table 6.3.11 below. There was no data made available for the private sector.

**Table 6.3.11 Pre-contract/Bidding Cost for other project types**

| Project Category | Project ID | Capital Value (£m) | Pre-contract/Bidding Cost Out-turns | | | | Sector |
|---|---|---|---|---|---|---|---|
| | | | original (£m) | actual (£m) | variation (£m) | % variation | |
| Others(offices, | 17 | 100 | 1 | 1.6 | 0.6 | **60** | public |
| | 11 | 300 | 2 | 4 | 2 | **100** | public |
| | 7 | 20 | 0.75 | 2 | 1.25 | **166.7** | public |

Again the data here revealed high levels of pre-contract/bidding cost overruns with one of them as high as 167%.

In summary, the data analysed revealed very high levels of time and cost overruns during the pre-contract stages of the PPP project procurement. The average time overruns for the projects studied were ***38%*** for Civil Engineering projects, ***50%*** for Health projects and ***64%*** for School projects. In some instances the time overruns were as high as ***100 to 300%***. In absolute terms, the overall times taken to take the projects to contract signing stage were in the range of ***12 to 60 months***. The bidding/pre-contract cost overruns were found to be equally high, with one project recording as high as ***200%*** overrun to the private sector. Not only were the overruns high but also cost in monetary terms to the private sector was high from a range of ***£0.1m to £6.0m***. The public sector costs were equally high, ranging from ***£0.4m to £8m.*** Evidently, the educational/schools sector projects witnessed the highest overruns followed by the health sector projects. The least overruns were those of major civil engineering projects.

## 6.4 Attribute Analysis

This section of the analysis deals with the main thrust of the research – developing and statistically testing a hierarchy of attributes that significantly and positively influence the PPP/PFI pre-contract negotiation process towards achieving satisfactory outcomes in a timely and cost efficient manner. As indicated in the main introduction to this chapter, based on the rating provided by the respondents to Parts II to IV of the research questionnaire, the underlying attributes of the main centres of influence – the Consortium, the Public Sector procurer, the Project, and the External Environment, have been subjected to rigorous statistical analysis in order to develop, test and validate the hierarchy. The details of the methodology have been outlined in Chapter 5 of this thesis. Table 6.4.1 provides the summary statistics for the analysed data. The analysis shows high level of statistical significance with $p < 0.001$ and equally high levels of correlation for the split half analysis.

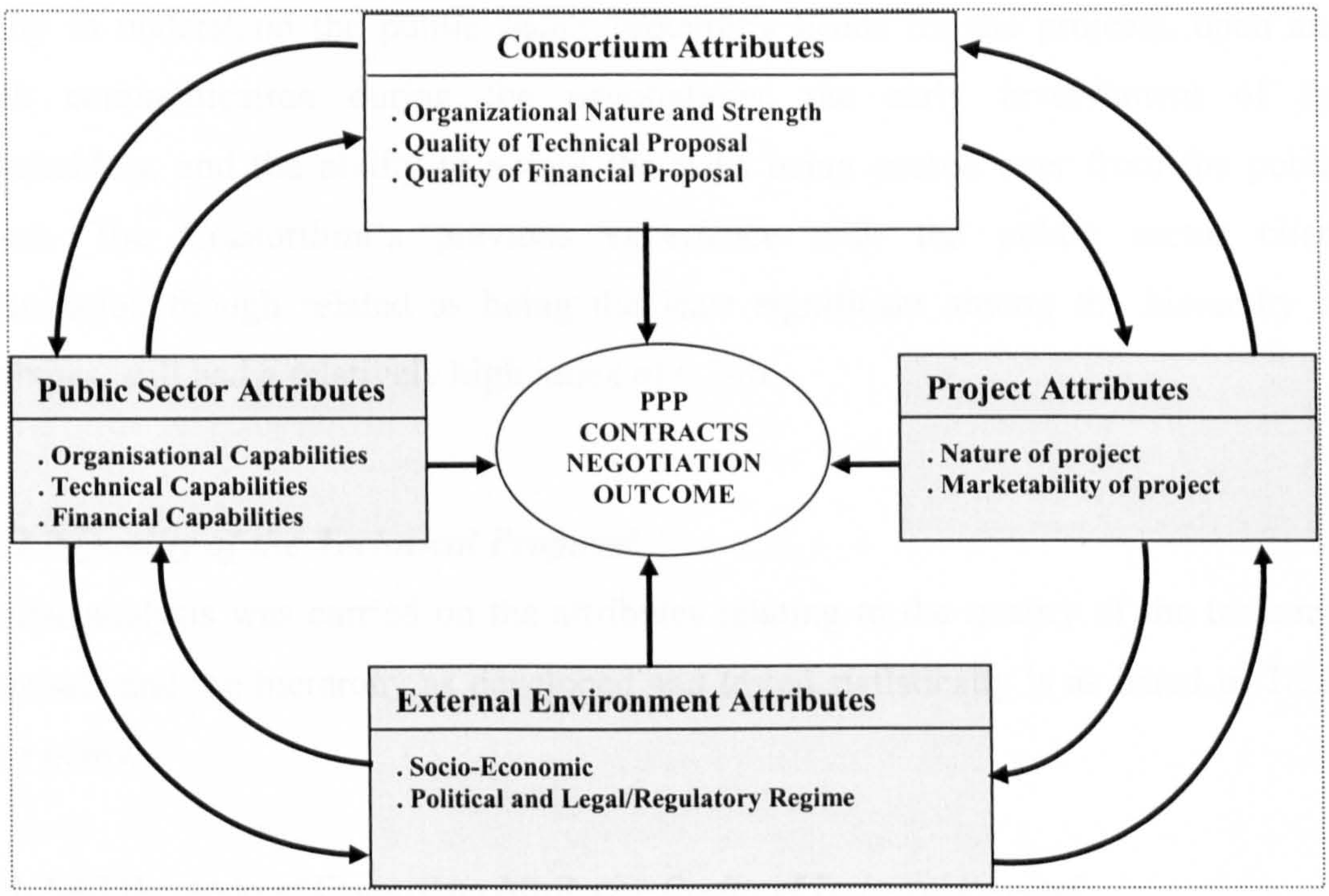
**Table 6.4.1 Summary Statistics for the spit half analysis**

| Main Components | Main Attributes | The Model Results (n = 49) | | Split-Half Results | | | | Spearman's Correlation Coefficient $\sigma$ | Kendall's Coefficient of Concordance $W$ | Statistical test of Significance (one-tail test) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Split 1 (n = 24) | | Split 2 (n = 25) | | | | |
| | | Relative Significance Index | Ranking | Relative Significance Index | Ranking | Relative Significance Index | Ranking | | | |
| The Consortium | *Nature and Strength* | 0.738 | 1 | 0.740 | 1 | 0.736 | 1 | **0.935** | 0.957 | $p < 0.001$ |
| | *Quality of Technical Proposal* | 0.723 | 2 | 0.738 | 2 | 0.710 | 2 | | | |
| | *Quality of the Financial Proposal* | 0.652 | 3 | 0.648 | 3 | 0.656 | 3 | | | |
| The Public Sector Client | *Organisational Capabilities* | 0.736 | 2 | 0.735 | 1 | 0.737 | 2 | **0.838** | 0.892 | $p < 0.001$ |
| | *Technical Capabilities* | 0.739 | 1 | 0.726 | 2 | 0.751 | 1 | | | |
| | *Financial Capabilities* | 0.578 | 3 | 0.563 | 3 | 0.592 | 3 | | | |
| The Project | *Nature of Project* | 0.665 | 1 | 0.657 | 1 | 0.684 | 1 | **0.949** | 0.966 | $p < 0.001$ |
| | *Marketability of Project* | 0.656 | 2 | 0.633 | 2 | 0.678 | 2 | | | |
| The External Environment | *Socio-Economic* | 0.673 | 1 | 0.635 | 1 | 0.710 | 1 | **0.898** | 0.932 | $p < 0.001$ |
| | *Political/Legal/Regulatory regime* | 0.623 | 2 | 0.604 | 2 | 0.641 | 2 | | | |

The sections that follow provide detailed analysis of each component from which the above summary has been extracted. Taking the Consortium as an example, a hierarchical order of the sub-attributes under the respective attributes – Nature and Strength, Quality of Technical Proposal and Quality of Financial Proposal, has been established and tested statistically.

### 6.4.2 Consortium Attributes

The analysis carried out to determine the hierarchical order of attributes in terms of their level of relative significance with respect to the time and cost efficiency in the PPP negotiation process is based on the formula stipulated in Section 5.6.2 of Chapter 5. Only the key results of the analysis are presented in this section. The detailed analyses of the data have been presented in the respective appendices. The derived hierarchy was subjected to analytical statistical tests using the Spearman Rank Correlation Coefficient and the Kendall's Coefficient of Concordance. The computations relating to the derivation of the hierarchy, and the detailed test analysis have been included in the thesis as Appendix C.1




#### *6.4.2.1 Organisational Nature and Strength*

Table 6.4.2 lists in the hierarchical order of relative importance of the underlying attributes for organisational nature and strength for the Consortium. Within the table, *isub* refers to the relative significance index for the sub-attributes whilst *imain* refers to the relative significance index for the main attributes.

**Table 6.4.2 Hierarchy of Consortium Attributes- *Organisational Nature and Strength***

| code | Attributes | *i sub* | *ranking* | *i main* |
|---|---|---|---|---|
| cs | ***Orgnisational Nature and Strength*** | | | **0.738** |
| cs9 | Appointing a dedicated bid manager | **0.865** | 1 | |
| cs10 | Understanding the public sector needs. | **0.853** | 2 | |
| cs6 | Open/frank communication. | **0.841** | 3 | |
| cs15 | Early involvement of other stakeholders | **0.833** | 4 | |
| cs11 | Ability to work harmoniously. | **0.820** | 5 | |
| cs5 | Readiness to accept risk. | **0.816** | 6 | |
| cs17 | Perseverance during protracted negotiations. | **0.812** | 7 | |
| cs1 | Previous experience in PPP. | **0.792** | 8 | |
| cs16 | Champion's personal attribute | **0.755** | 9 | |
| cs7 | Commitment to earlier negotiated terms. | **0.751** | 10 | |
| cs2 | Consortium's reputation. | **0.702** | 11 | |
| cs3 | PPP being a strategic business interest | **0.686** | 12 | |
| cs4 | Ability to tie equity for a long period. | **0.682** | 13 | |
| cs18 | Multidisciplinary team. | **0.669** | 14 | |
| cs12 | Previous experience as a team | **0.665** | 15 | |
| cs14 | Timely planning permission. | **0.657** | 16 | |
| cs13 | Proactive role in initiating the project. | **0.629** | 17 | |
| cs8 | Current job holding. | **0.604** | 18 | |
| cs19 | Previous experience with client. | **0.596** | 19 | |

The top five attributes include the appointment of a dedicated Bid Manager, the ability to understand the public sector procurer's needs for the projects, open and frank communication during the negotiations, the early involvement of the stakeholders, and the ability to accept the risks being passed over from the public sector. The Consortium's previous experience with the public sector client organisation though related as being the least significant among the hierarchy of attributes, still had a relatively high index of 0.596

### *6.4.2.2 Quality of the Technical Proposal*

Similar analysis was carried on the attributes relating to the quality of the technical proposals and the hierarchy as developed and tested statistically is as listed in Table 6.4.3 below.

**Table 6.4.3 Hierarchy of Consortium Attributes- *Quality of Technical Proposal***

| code | Attributes | *i sub* | *ranking* | *i main* |
|---|---|---|---|---|
| ct | ***Quality of Technical Proposal*** | | | **0.723** |
| ct2 | Clarity of submissions/responses | **0.800** | 1 | |
| ct1 | Robustness of outline technical proposal. | **0.780** | 2 | |
| ct4 | Provision of sound technical guarantee. | **0.673** | 3 | |
| ct3 | Innovative technical solutions. | **0.641** | 4 | |

Top among the attributes is the importance attached to the quality of the submissions and the responses to queries raised on the bids, followed by the robustness in terms of not only meeting the client's needs but also being judged to be able to meet the test of

time as the contracts are generally of long duration in nature. Though the submission of innovative technical solutions was regarded among the attributes as of the least significance, it also scored highly on the significance index, an indication that that it is also rated highly in contributing to the attainment of an efficient negotiation process during the procurement of PPP projects.

### *6.4.2.3 Quality of the Financial Proposal*

The hierarchy of the underlying attributes relating to the quality of the financial proposals is listed in Table 6.4.4 with their respective relative significance indices.

**Table 6.4.4 Hierarchy of Consortium Attributes- *Quality of Financial Proposal***

| code | Attributes | *i sub* | *ranking* | *i main* |
|---|---|---|---|---|
| | ***Quality of the Financial Proposal*** | | | **0.652** |
| cf4 | Levels of tariff/tolls proposed | **0.845** | 1 | |
| cf5 | Credibility of financiers | **0.767** | 2 | |
| cf6 | Client's exposure to financial risks | **0.763** | 3 | |
| cf1 | Financial guarantees provided/proposed | **0.739** | 4 | |
| cf2 | Payment mechanisms proposed | **0.731** | 5 | |
| cf3 | Government funding/guarantees required. | **0.641** | 6 | |
| cf8 | Length of concession period proposed. | **0.567** | 7 | |
| cf7 | Financial returns to the public sector client. | **0.551** | 8 | |
| cf10 | High Equity/debt ratio to drive commitment. | **0.465** | 9 | |
| cf9 | Third party revenue to be generated. | **0.453** | 10 | |

Top among the attributes is the importance attached to the level of tariffs/tolls proposed by the consortium. This is not surprising as this is at the very heart of the PPP philosophy. The credibility of the project financier comes next. High equity/debt ratio and the amount of third party revenue generation incorporated the financial proposals received quite low level of considerations with relative significance index scores below 0.50

**Figure 6.4.1 shows how the main attributes relating to the Consortium compare in terms of their relative significance.**

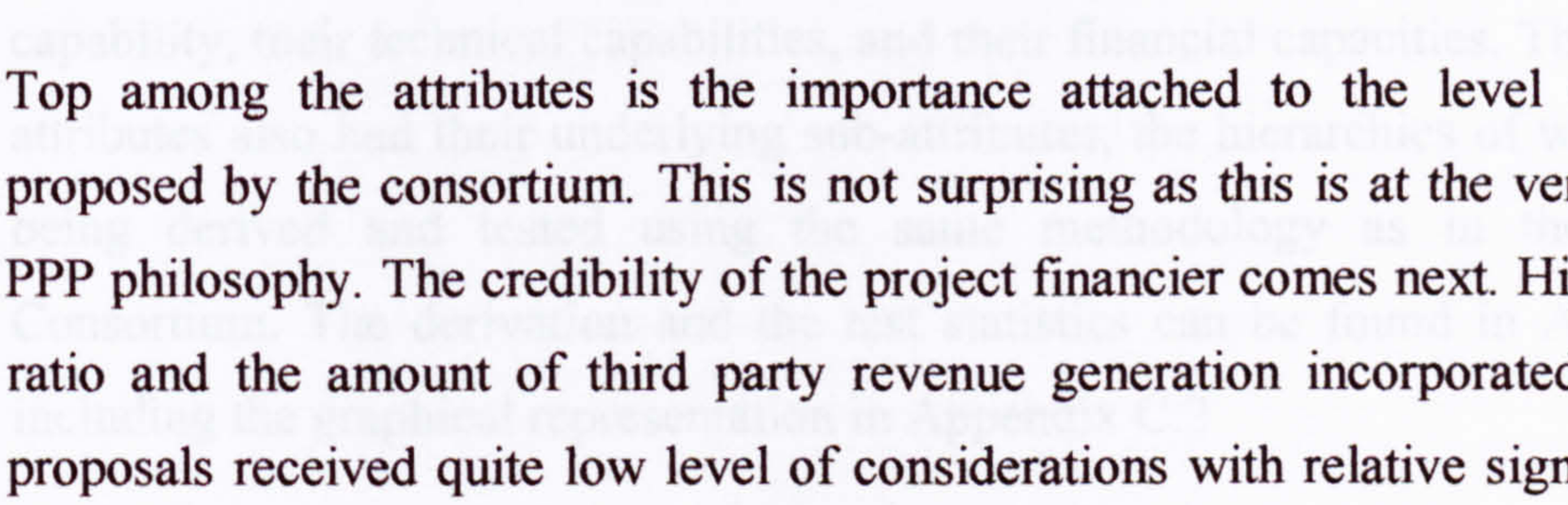
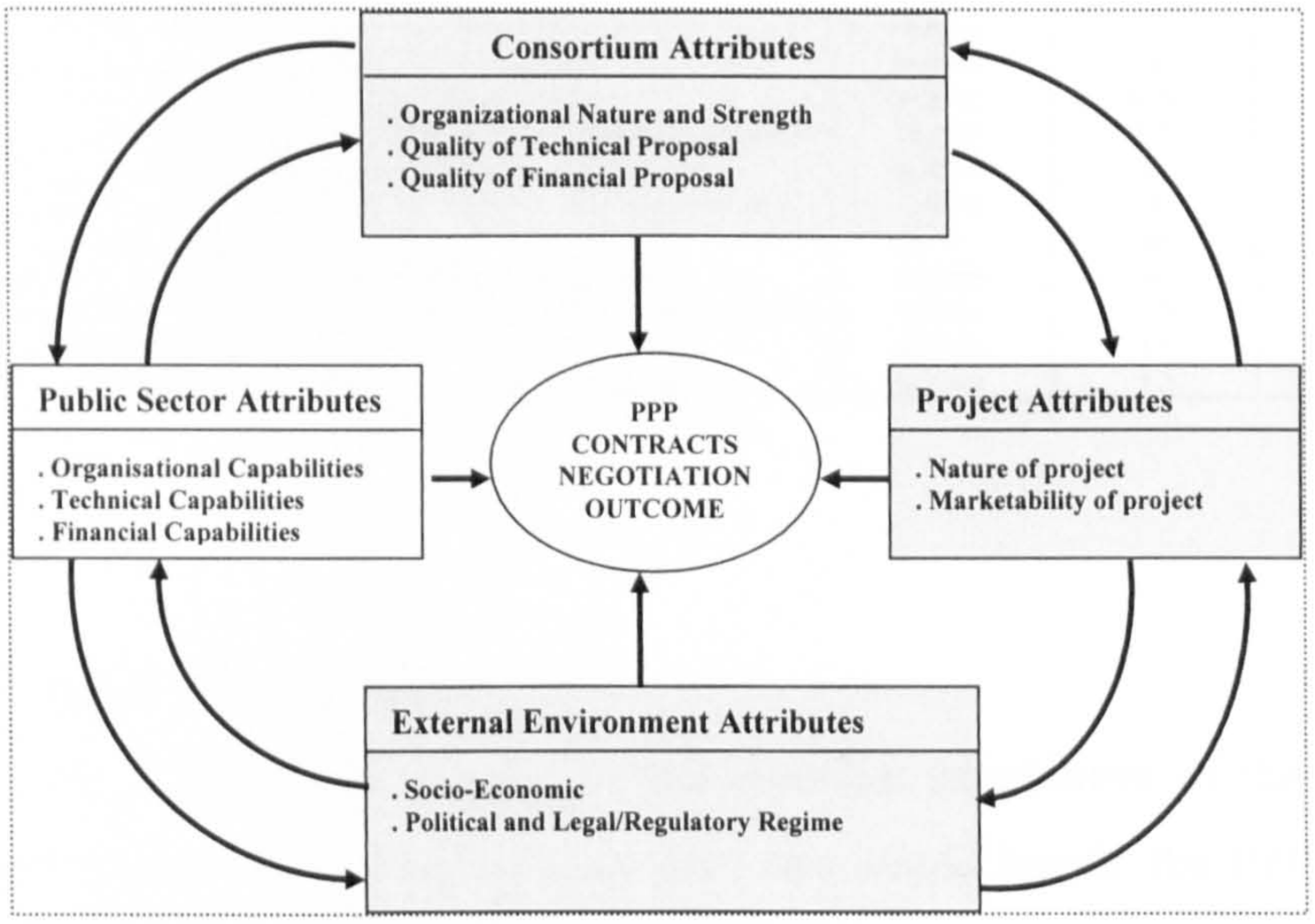



**Figure 6.4.1 Relative Significance of the main Consortium Attributes**

## 6.4.3 Public Sector Client Attributes




The Public Sector Client's role in the efficient realisation of the negotiation process in order to minimize and/or eliminate the twin problems of pre-contract time and bidding cost overruns were considered under three main attributes – the organisational capability, their technical capabilities, and their financial capacities. These three main attributes also had their underlying sub-attributes, the hierarchies of which have also being derived and tested using the same methodology as in the case of the Consortium. The derivation and the test statistics can be found in Appendices C.1 including the graphical representation in Appendix C.2

### *6.4.3.1 Organisation Capabilities*

Top among the attributes relating to the organisational capabilities of the public sector client level of commitment to the project exhibited by top management, followed by collaboration within the negotiating team.

Table 6.4.5 overleaf gives the rank order of the public sector client attributes relating to their organisational capabilities

**Table 6.4.5 Hierarchy of Public Sector Client Attributes – *Organisational Capabilities***

| code | Attributes | *i sub* | *ranking* | *i main* |
|---|---|---|---|---|
| po | ***Organisational Capabilities*** | | | **0.736** |
| po5 | Top level commitment | **0.902** | 1 | |
| po6 | Team collaboration and commitment | **0.865** | 2 | |
| po7 | Open/frank and flexible communication | **0.849** | 3 | |
| po11 | Commitment to earlier negotiated terms | **0.747** | 4.5 | |
| po3 | Level of bureaucracy in the decision making process | **0.747** | 4.5 | |
| po12 | Ability to accept and absorb risks | **0.714** | 6 | |
| po9 | Assisting in land acquisition and in obtaining permits | **0.698** | 7 | |
| po4 | Right attitude to cost | **0.694** | 8 | |
| po1 | Ability to effectively sensitise public opinion | **0.686** | 9 | |
| po10 | Tapping knowledge and expertise gained elsewhere | **0.665** | 10 | |
| po8 | Pre-established PPP Unit | **0.637** | 11 | |
| po2 | Level of reputation enjoyed by the organisation. | **0.633** | 12 | |

### *6.4.3.2 Technical Capabilities*

The hierarchy of attributes relating to the technical capabilities of the public sector client organisation with respect to how best they could handle the PPP procurement process towards achieving efficiency by preventing excessive pre-contract time and cost overruns is indicate as shown in Table 6.4.6

**Table 6.4.6 Hierarchy of Public Sector Client Attributes – *Technical Capabilities***

| code | Attributes | *i sub* | *ranking* | *i main* |
|---|---|---|---|---|
| pt | ***Technical Capabilities*** | | | **0.739** |
| pt6 | Clear output specifications | **0.829** | 1 | |
| pt1 | Strong in-house expertise | **0.759** | 3 | |
| pt2 | Sound preparatory work | **0.759** | 3 | |
| pt5 | Clearly established evaluation criteria | **0.759** | 3 | |
| pt4 | Experience in infrastructure procurement | **0.698** | 5 | |
| pt7 | The use of standard bidding documents | **0.690** | 6 | |
| pt3 | Previous experience in PPP procurement | **0.678** | 7 | |

The ability to clearly spell out the needs in the form of clear and concise output specifications has come top among the attributes. Strong in-house technical expertise has also been recognised as a necessary vital element that must exist within the public sector organisation wanting to undertake projects using the PPP strategy.

### *6.4.3.2 Financial Capabilities*

Within the group of the Public Sector Client attributes relating to their financial capabilities and/or strength, the capacity to pay the tariffs ranks top, followed by a strong financial support from the central government especially when the project is being initiated at the local level.

**Table 6.4.7 Hierarchy of Public Sector Client Attributes – *Financial Capabilities***

| code | Attributes | *i sub* | *ranking* | *i main* |
|---|---|---|---|---|
| | ***Financial Capabilities*** | | | **0.578** |
| pf5 | Capability to pay | **0.767** | 1 | |
| pf2 | Strong financial support/guarantees from the central govt | **0.747** | 2 | |
| pf3 | Flexible tax regimes. | **0.465** | 3 | |
| pf1 | Ability to raise funds through Bonds. | **0.457** | 4 | |
| pf4 | Ability to provide equity finance. | **0.453** | 5 | |

Comparing the three main attributes, the possession of strong technical capabilities was considered as the most important among the main attributes followed by the organisational capability as illustrated in Figure 6.4.2 below. Financial capability was considered the least among the three main attributes.

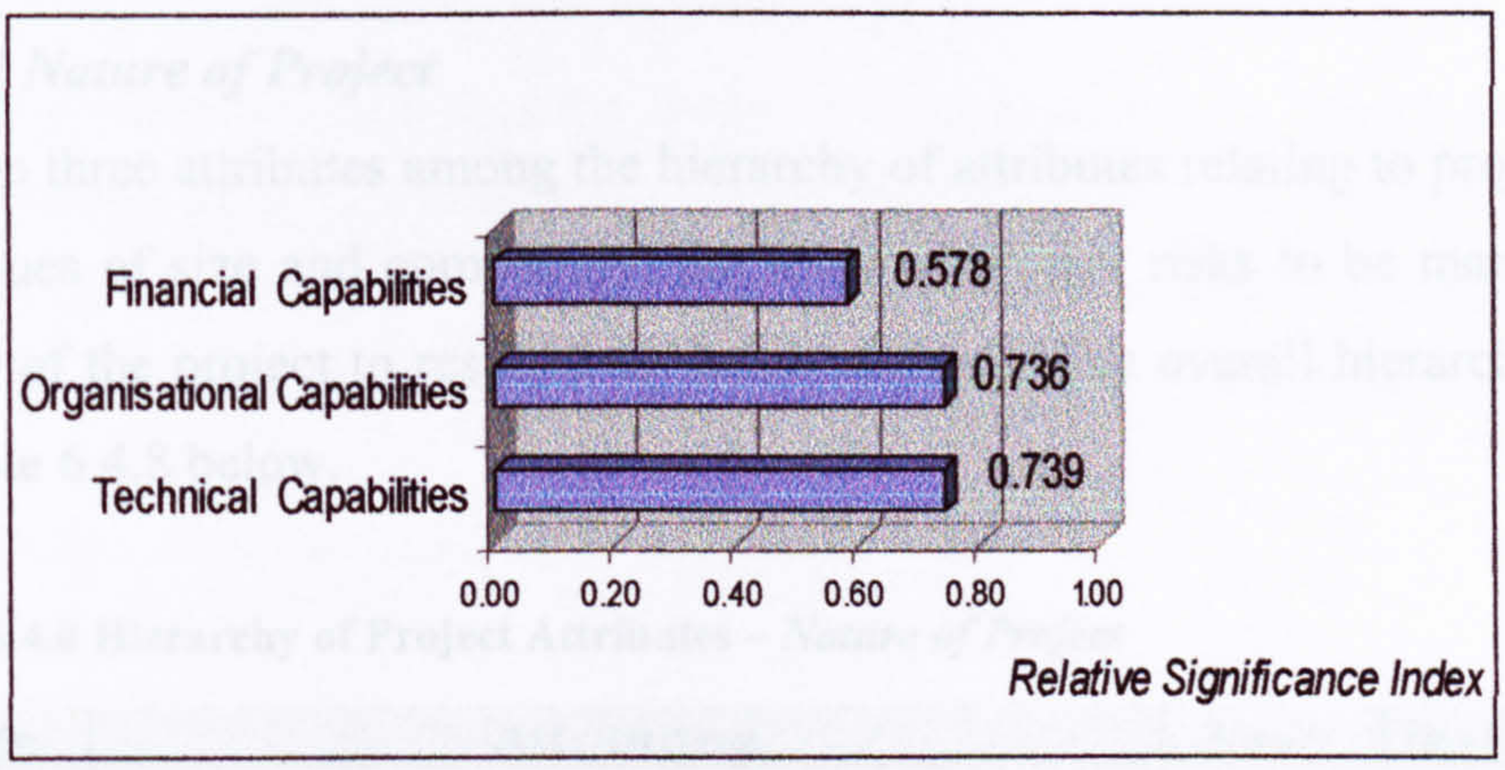
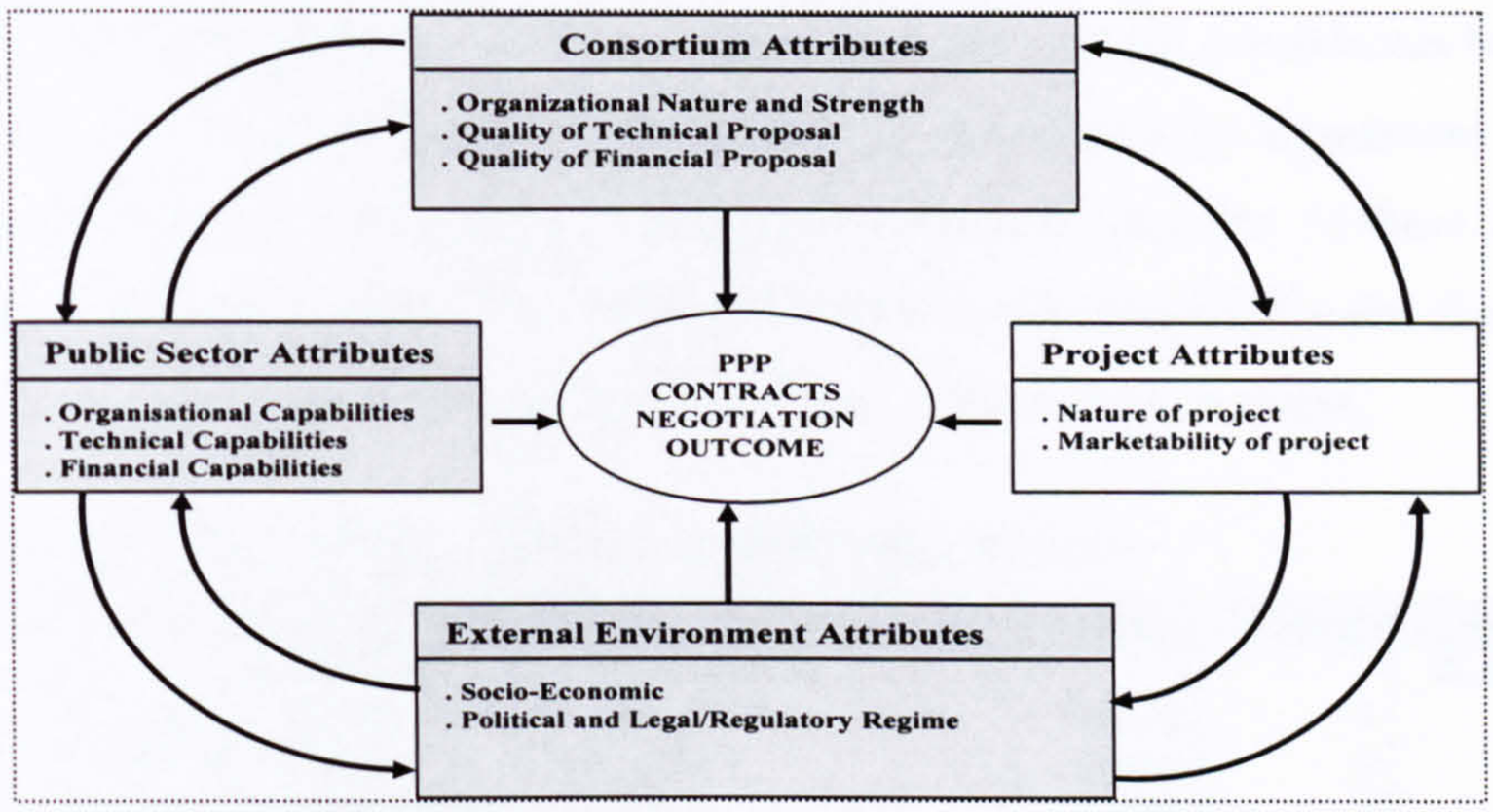



**Figure 6.4.2 Relative Significance of the main Public Sector Client Attributes**

## 6.4.4 Project Attributes




The effect of the project characteristics in influencing the process towards an efficient and timely negotiation of the procurement process was considered under two main attributes – the nature of the project, and the marketability of the project. As in the case of the others, the detailed analysis for derived hierarchy and the test statistics can be found in Appendix C.1

### *6.4.4.1 Nature of Project*

The top three attributes among the hierarchy of attributes relating to project nature are the issues of size and complexity, the level of project risks to be managed, and the ability of the project to respond to future changes. The overall hierarchy is indicated in Table 6.4.8 below.

**Table 6.4.8 Hierarchy of Project Attributes – *Nature of Project***

| code | Attributes | *i sub* | *ranking* | *i main* |
|---|---|---|---|---|
| pn | ***Nature of Project*** | | | **0.665** |
| pn1 | Size and complexity | **0.788** | 1 | |
| pn3 | Project risk management | **0.759** | 2.5 | |
| pn8 | Ability to respond to future changes. | **0.759** | 2.5 | |
| pn7 | Design completion required at tender. | **0.702** | 4 | |
| pn9 | Project location and site conditions | **0.694** | 5 | |
| pn4 | Impact on the environment | **0.633** | 6 | |
| pn10 | Uniqueness of project | **0.624** | 7.5 | |
| pn2 | Amenability to innovation | **0.624** | 7.5 | |
| pn6 | Health and safety provoked | **0.584** | 9.5 | |
| pn11 | Effect on existing public sector staff | **0.584** | 9.5 | |
| pn5 | Third party improving existing infrastructure | **0.563** | 11 | |

### *6.4.4.2 Marketability of project*

The very large size of most PPP projects calls for heavy capital investments both form the private sector consortium in the form of equity and from large investment banks in the form of loans. The projects therefore have to be both attractive to these investors and hence should be marketable. Table 6.4.9 lists in a hierarchical order the relative significance of the underlying dimensions of the marketability attribute.

**Table 6.4.9 Hierarchy of Project Attributes – *Marketability of project***

| code | Attributes | *i sub* | *ranking* | *i main* |
|---|---|---|---|---|
| pm | ***Marketability of project*** | | | **0.656** |
| pm5 | Bankability of project | **0.890** | 1 | |
| pm1 | Suitability for private participation | **0.824** | 2 | |
| pm2 | Meeting general public needs | **0.755** | 3 | |
| pm10 | Level of tariffs and tolls. | **0.722** | 4 | |
| pm4 | Useful life after concession period. | **0.661** | 5 | |
| pm3 | Potential for land and property buyouts. | **0.637** | 6 | |
| pm8 | Opportunities for future refinancing | **0.584** | 7 | |
| pm6 | Monopolistic advantage | **0.539** | 8 | |
| pm9 | Potential for property development rights | **0.494** | 9 | |
| pm7 | Third party revenue potentials | **0.453** | 10 | |

The sub-attribute referred to as the bankability of the project tops the list with a relative significance index of *0.890*, followed by the suitability of the project for private participation, and then the ability of the project to meet general public needs. Least among them with a rather low significance index of *0.453* is the potential of the project to generate third party revenue. Figure 6.4.3 indicates how the two main project attributes compare with each other in terms of their relative significance.

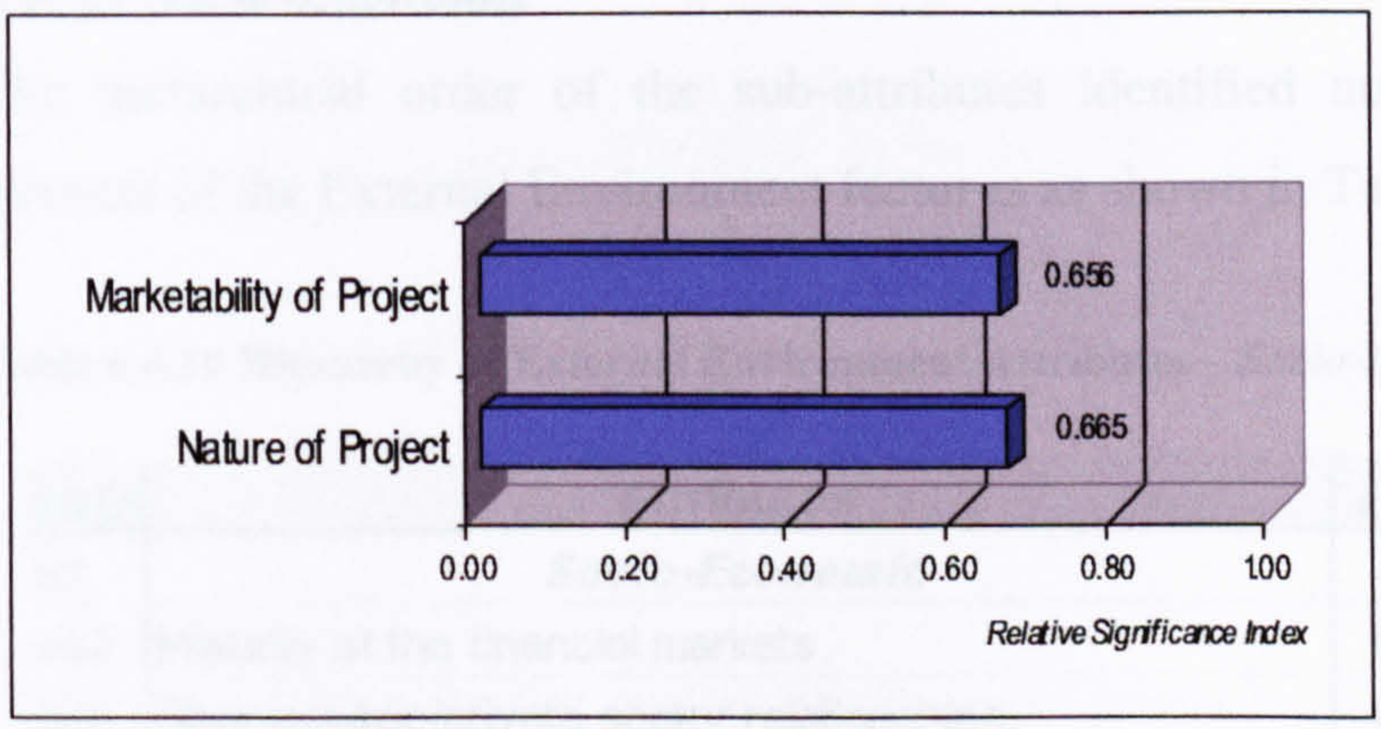
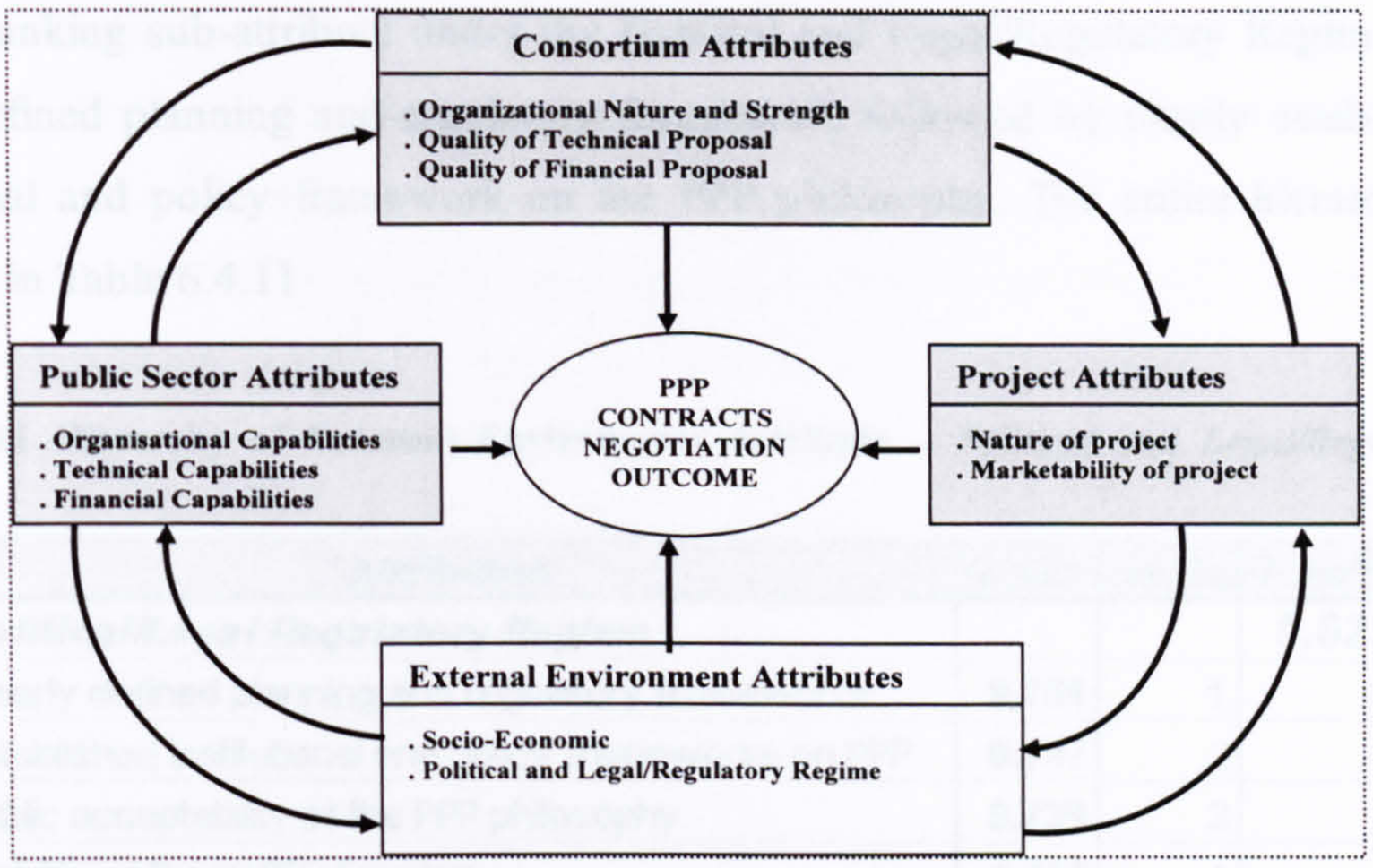



**Figure 6.4.3 Relative Significance of the main Project Attributes**

## 6.4.5 External Environment Attributes




Every project or scheme is subjected to a barrage of elements that are broadly termed as external to the project. These elements may be categorised as socio-economic, and political/legal/regulatory regimes

The sub-attributes that have been identified as falling under the main External Environment Attributes have been analysed and a hierarchy developed on the basis of the relative significance with respect to the objective of this study. The detailed analyses are included in Appendix C.1

### *6.4.5.1 Socio-Economic*

The hierarchical order of the sub-attributes identified under the socio-economic element of the External Environment factor is as shown in Table 6.4.10

**Table 6.4.10 Hierarchy of External Environment Attributes – *Socio-Economic***

| code | Attributes | *i sub* | *ranking* | *i main* |
|---|---|---|---|---|
| es | ***Socio-Economic*** | | | ***0.673*** |
| es2 | Maturity of the financial markets. | **0.735** | 1 | |
| es5 | Strong public/private sector relationships. | **0.722** | 2 | |
| es3 | Perceived future economic uncertainties | **0.682** | 3 | |
| es4 | Potential for future equity purchase in PPP pjts | **0.629** | 4 | |
| es1 | Availability of traditional projects. | **0.600** | 5 | |

### *6.4.5.2 Political and Legal/Regulatory Regime*

The top ranking sub-attribute under the Political and Legal/Regulatory Regime is a clearly defined planning and regulatory framework, followed by clearly established institutional and policy framework on the PPP philosophy. The entire hierarchy is presented in Table 6.4.11

**Table 6.4.11 Hierarchy of External Environment Attribute – *Political and Legal/Regulatory Regime***

| code | Attributes | *i sub* | *ranking* | *i main* |
|---|---|---|---|---|
| el | ***Political/Legal/Regulatory Regime*** | | | **0.623** |
| el1 | Clearly defined planning and regulatory frameworks. | **0.751** | 1 | |
| el5 | Established institutional and policy frameworks on PPP | **0.747** | 2 | |
| ep1 | Public acceptability of the PPP philosophy. | **0.739** | 3 | |
| ep2 | Stability of the political system. | **0.727** | 4 | |
| ep3 | All-party political support for the philosopy | **0.718** | 5 | |
| el4 | Intellectual property rights. | **0.506** | 6 | |
| el3 | Clear regulations on foreign ownership of property. | **0.400** | 7 | |
| el2 | Ability of foreign investors to repatriate earnings. | **0.396** | 8 | |

As shown in Figure 6.4.4, when comparing the two main attributes, the socio-economic attribute had the highest relative significance index of ***0.673*** whilst the political and the legal/regulatory regime though coming second also has a quite a high significance index of ***0.623***

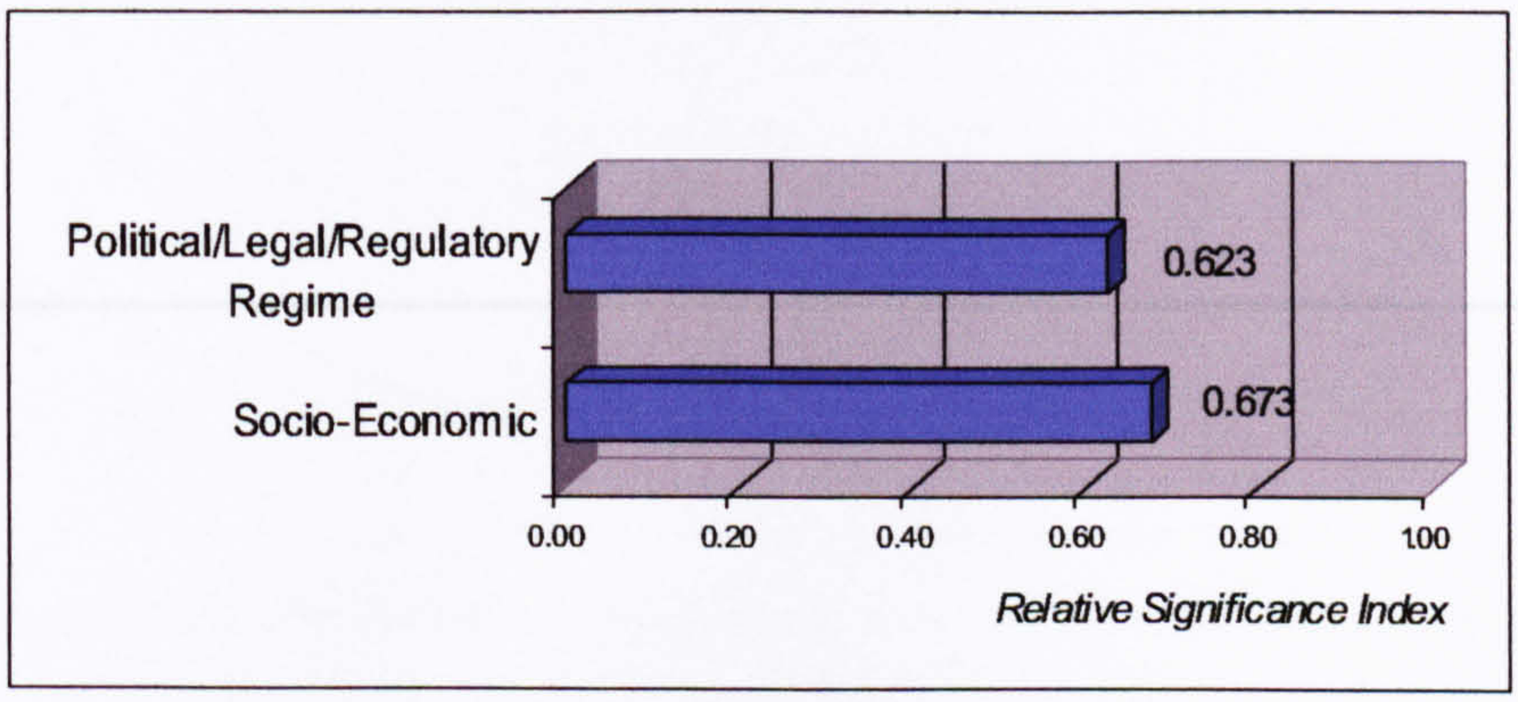



***Figure 6.4.4 Relative Significance of the main External Environment Attributes***

### 6.4.6 Overall Assessment of the Key Centres of Influence

Part IV of the questionnaire survey requested the respondents to provide their overall assessment of how the key elements – the Consortium, the Public Sector Client, the Project, and the External Environment Attributes influence the process towards achieving a timely and cost efficient negotiation process. Details of the statistical analyses have been included within the Appendix C.1. The public sector client attributes came top with a relative significance index of ***0.657*** followed by the Consortium, the Project and the External Environments Attributes in that order as shown in Figure 6.4.5

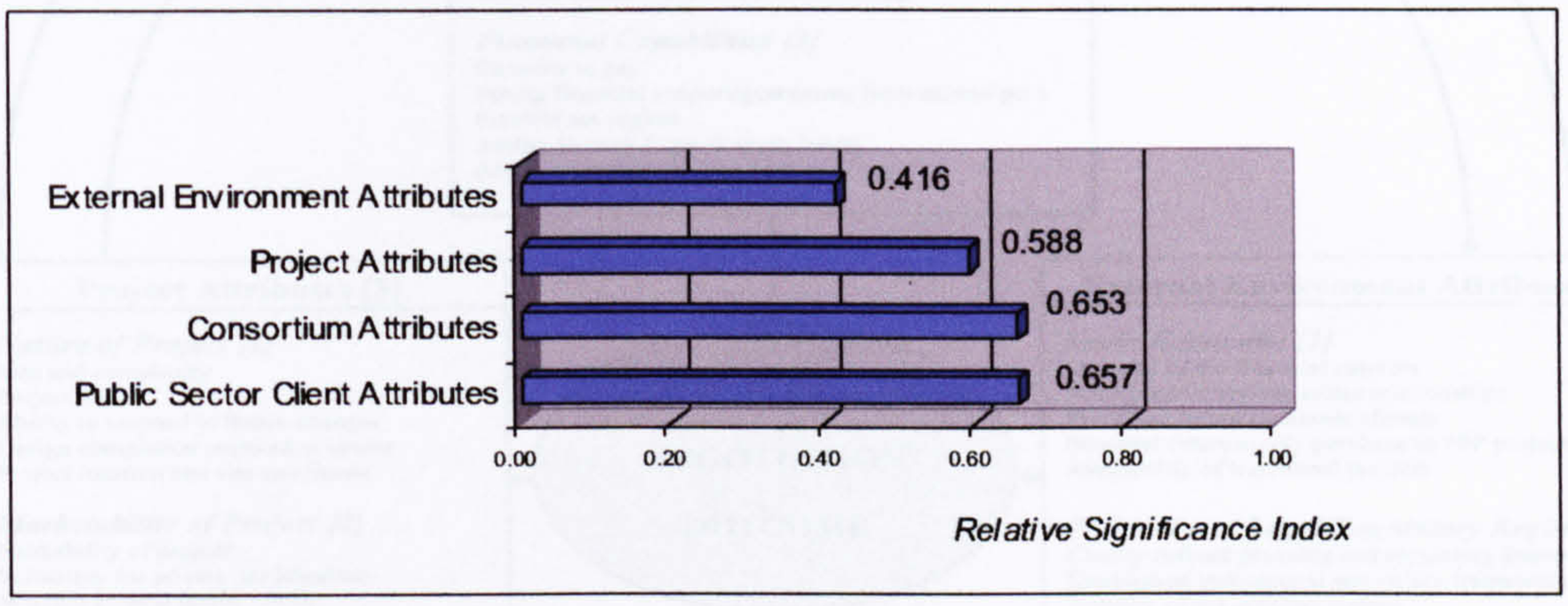



**Figure 6.4.5 Relative Significance of the Main Components**

## 6.5 The Generic Multi-Attribute Hierarchical Model (GmAHM)

### 6.5.1 The Model

Based on the analysis and the statistical tests carried out, the results of which have been reported in section 6.4, the complete model is reproduced here as Figure 6.5.1

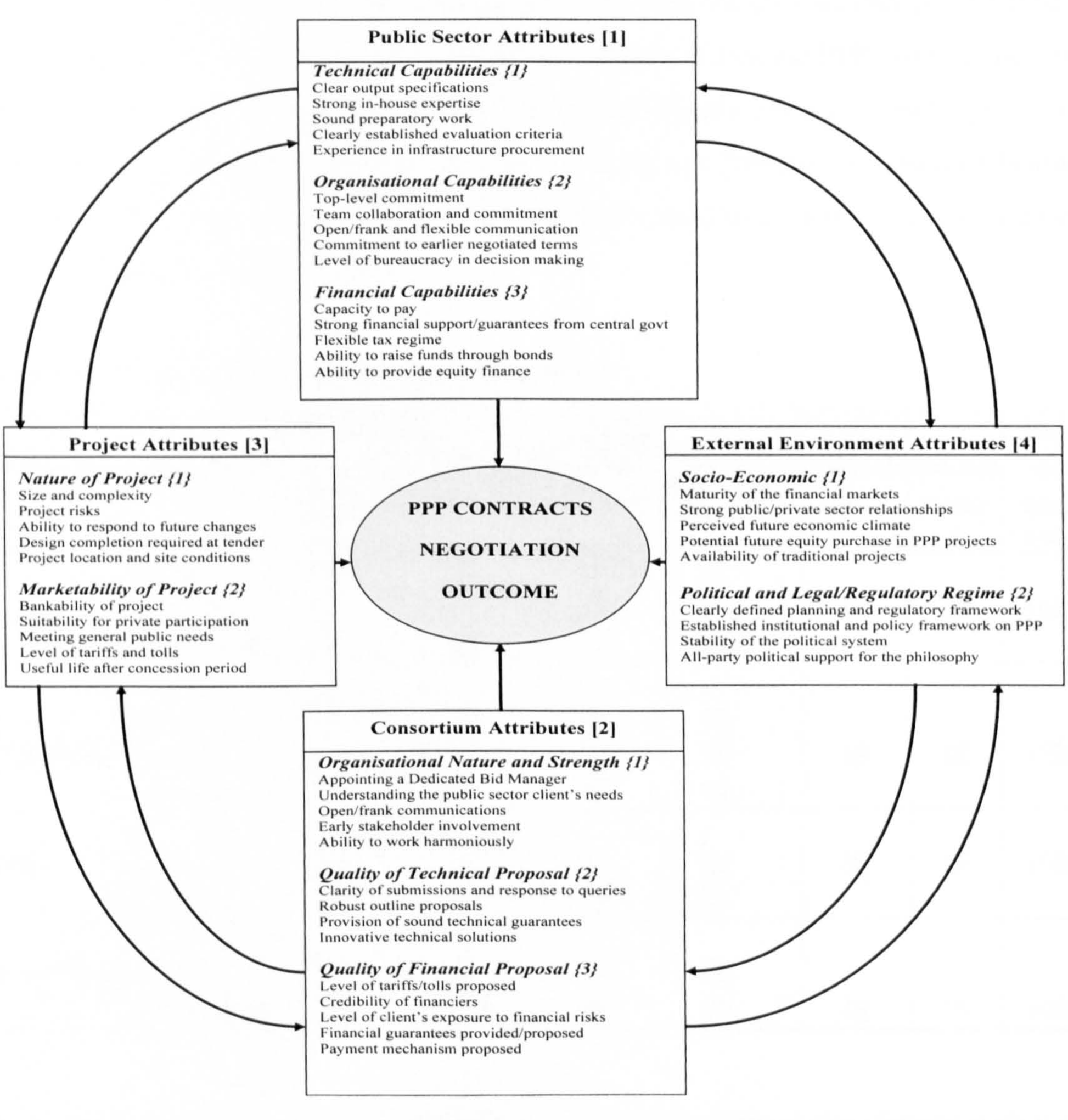



**Figure 6.5.1 PPP and Contract Negotiations: A Generic Multi-Attribute Hierarchical Model (GmAHM)**

For the purposes of parsimony, this model has been restricted up to the top five (5) sub-attributes in their respective hierarchical order of significance with respect to how they positively influence the efficient PPP procurement process toward achieving an early but satisfactory outcome. Supplemental to the model as Appendix C.2, is a table for each of the key components of the model, listing in a comprehensive hierarchical

order, all the relevant attributes identified and analysed, including their graphical representations.

### 6.5.2 Statistical Validation of the Model

In order to check for the true generic nature of the model a validation exercise was carried out. The process involved reorganising the data set into distinct project types reflecting the main sectors of the construction industry where the PPP programme has been actively pursued. These were the Education/Schools projects, Health projects, and major Civil Engineering projects. The summary test statistics is presented below in Table 6.5.1. The comprehensive and detailed computations and the analysis have been presented in Appendix C.3

**Table 6.5.1 Summary Statistics for validating the model**

| Main Components | Main Attributes | The Model Results (n = 49) | | Project Types | | | | | | Spearman's Correlation Coefficient $\sigma$ | Kendall's Coefficient of Concordance W | Statistical test of Significance (one-tail test) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Schools Projects (n = 18) | | Hospital Projects (n = 14) | | Civil Eng'ring Projects (n = 13) | | | | |
| | | Relative Significance Index | Ranking | Relative Significance Index | Ranking | Relative Significance Index | Ranking | Relative Significance Index | Ranking | | | |
| The Consortium | *Nature and Strength* | 0.738 | 1 | 0.757 | 1 | 0.733 | 1 | 0.717 | 2 | 0.875 | 0.906 | $p < 0.001$ |
| | *Quality of Technical Proposal* | 0.723 | 2 | 0.714 | 2 | 0.700 | 2 | 0.765 | 1 | | | |
| | *Quality of the Financial Proposal* | 0.652 | 3 | 0.636 | 3 | 0.593 | 3 | 0.672 | 3 | | | |
| The Public Sector Client | *Organisational Capabilities* | 0.736 | 2 | 0.758 | 1 | 0.707 | 2 | 0.749 | 2 | 0.808 | 0.856 | $p < 0.001$ |
| | *Technical Capabilities* | 0.739 | 1 | 0.727 | 2 | 0.724 | 1 | 0.752 | 1 | | | |
| | *Financial Capabilities* | 0.578 | 3 | 0.606 | 3 | 0.576 | 3 | 0.551 | 3 | | | |
| The Project | *Nature of Project* | 0.665 | 1 | 0.674 | 1 | 0.664 | 1 | 0.657 | 2 | 0.844 | 0.883 | $p < 0.001$ |
| | *Marketability of Project* | 0.656 | 2 | 0.650 | 2 | 0.636 | 2 | 0.674 | 1 | | | |
| The External Environment | *Socio-Economic* | 0.673 | 2 | 0.677 | 1 | 0.720 | 1 | 0.638 | 1 | 0.806 | 0.855 | $p < 0.001$ |
| | *Political/Legal/Regulatory Regime* | 0.623 | 1 | 0.619 | 2 | 0.650 | 2 | 0.590 | 2 | | | |

The validation statistical results showed high levels of statistical significance with $p < 0.001$ in all the cases. The correlation coefficients and the coefficients of concordance were equally high. The detailed computations and the results for each component of the model are presented in the subsequent sections that follow.

#### *6.5.2.1 Consortium Attributes*

The rank orders of the sub-attributes for each of the main attributes for the Consortium within the model generated were statistically tested in a series of

combinations with data for civil engineering projects, health projects and school projects.

Table 6.5.2 provides a summary of the key statistical results obtained during the analysis.

**Table 6.5.2 Model validation results - *Consortium Attributes***

| Correlation Combinations | Spearman's Rank Correlation Coefficients | | |
|---|---|---|---|
| | *Organisational Nature* | *Quality of Technical Proposal* | *Quality of Financial Proposal* |
| Model/Civil En'g Projects | 0.882 | 1.000 | 0.954 |
| Model/Health Projects | 0.837 | 0.800 | 0.863 |
| Model/School Projects | 0.856 | 1.000 | 0.942 |
| Civil En'g/Health Projects | 0.837 | 0.800 | 0.822 |
| Civil En'g/School Projects | 0.748 | 1.000 | 0.865 |
| Health/School Projects | 0.673 | 1.000 | 0.863 |
| *p < 0.001 (one tail)* | | | |

The results reflect very high levels of correlation between the model and the other project types and between project-to-project types. Statistically, the correlations were equally significant with $p < 0.001$

### *6.5.2.2 Public Sector Client Attributes*

Table 6.5.3 provides the validation results for the Public Sector Client Attributes. Again the correlation coefficients were very high and the test statistics was equally significant with $p < 0.001$

**Table 6.5.3 Model validation results – *Public Sector Client Attributes***

| Correlation Combinations | Spearman's Rank Correlation Coefficients | | |
|---|---|---|---|
| | *Organisational Capabilities* | *Technical Capabilities* | *Financial Capabilities* |
| Model/Civil En'g Projects | 0.911 | 0.927 | 0.900 |
| Model/Health Projects | 0.865 | 0.542 | 0.900 |
| Model/School Projects | 0.946 | 0.954 | 0.872 |
| Civil En'g/Health Projects | 0.675 | 0.721 | 0.800 |
| Civil En'g/School Projects | 0.833 | 0.829 | 0.975 |
| Health/School Projects | 0.768 | 0.418 | 0.718 |
| *p < 0.001 (one tail)* | | | |

### *6.5.2.3 Project Attributes*

The validation results of the project attributes are presented below as Table 6.5.4. The Spearman's Rank Correlation Coefficients were very high generally and at very significant statistical level of $p < 0.001$ also.

**Table 6.5.4 Model validation results – *Project Attributes***

| Correlation Combinations | Spearman's Rank Correlation Coefficient | |
|---|---|---|
| | *Project Nature* | *Marketability* |
| Model/Civil En'g Projects | 0.873 | 0.979 |
| Model/Health Projects | 0.802 | 0.976 |
| Model/School Projects | 0.839 | 1.000 |
| Civil En'g/Health Projects | 0.530 | 0.948 |
| Civil En'g/School Projects | 0.656 | 0.979 |
| Health/School Projects | 0.568 | 0.976 |
| *p < 0.001 (one tail)* | | |

### *6.5.2.4 External Environment Attributes*

There were equally positive correlations between the model and the other project types for the External Environment Attributes. The correlation between the individual project types was also generally high. The level of statistical significance was equally good with $p < 0.001$. The results are presented in Table 6.5.5 below.

**Table 6.5.5 Model validation results – *External Environment Attributes***

| Correlation Combinations | Spearman's Rank Correlation Coefficient | |
|---|---|---|
| | *Socio-Economic* | *Politica/Legal/Regulatory* |
| Model/Civil En'g Projects | 0.949 | 0.898 |
| Model/Health Projects | 0.949 | 0.566 |
| Model/School Projects | 0.900 | 0.952 |
| Civil En'g/Health Projects | 0.949 | 0.703 |
| Civil En'g/School Projects | 0.738 | 0.838 |
| Health/School Projects | 0.700 | 0.530 |
| *p < 0.001 (one tail)* | | |

### 6.5.3 Feedback Validation of the Model

The model was further subjected to external validation for practical relevance, completeness, robustness. The analysis of the feedback results is indicated in Table 6.5.6 below. The criteria for evaluating the model are as follows:

a) ***Completeness***: Comprehensiveness in the coverage of the key attributes.
b) ***Practical Relevance:*** The usefulness of the model in identifying competency gaps.
c) ***Robustness***: The extent to which the model reflects reality as a guide to decision making.

The experts were requested to rate the model according to the above criteria as follows:

| | | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|---|
| **Completeness** | Low | ☐ | ☐ | ☐ | ☐ | ☐ | High |
| **Practical Relevance** | Low | ☐ | ☐ | ☐ | ☐ | ☐ | High |
| **Robustness** | Low | ☐ | ☐ | ☐ | ☐ | ☐ | High |

They were also asked to add any further comments if they wished to do so.

**Table 6.5.6 Analysis of feedback on the generic model**

| Criterion / expert | scores | | | | | | | | | | rating of individual criterion | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *a* | *b* | *c* | *d* | *e* | *f* | *g* | *h* | *i* | *j* | *rated index* | *%* | *ranking* |
| Completeness | 4 | 3 | 3 | 3 | 3 | 2 | 3 | 4 | 4 | 4 | 0.660 | 66 | 3 |
| Practical Relevance | 5 | 3 | 2 | 3 | 3 | 4 | 4 | 4 | 5 | 3 | 0.720 | 72 | 1 |
| Robustness | 4 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | 0.680 | 68 | 2 |

The feedback survey returned very high rating of the model for all three criteria. The *practical relevance* criterion, which assessed the model as a useful tool in identifying competency gaps within institutions undertaking PPP projects, ranked topmost with ***72%*** rating. This was followed by *robustness* criterion with a rating of ***68%,*** which assessed the extent to which the model could be used as a guide in decision making during the early stages of PPP procurement. The *completeness* criterion received ***66%*** rating. This criterion relates the extent to which the model has comprehensively captured the key attributes. The detailed computations have been included in Appendix C.4

Ten (10) industrial experts provided feedback on the model, eight (8) of whom had participated in the initial data gathering survey. The two others, who did not participate in the initial survey, were selected through contacts made with them during workshops and conferences at the later stages of the study. All the feedback participants were top ranking officials active in PPP/PFI project procurement ranging from Directors to Development Managers within both public and private sector organisations that are actively involved in PPP/PFI projects.

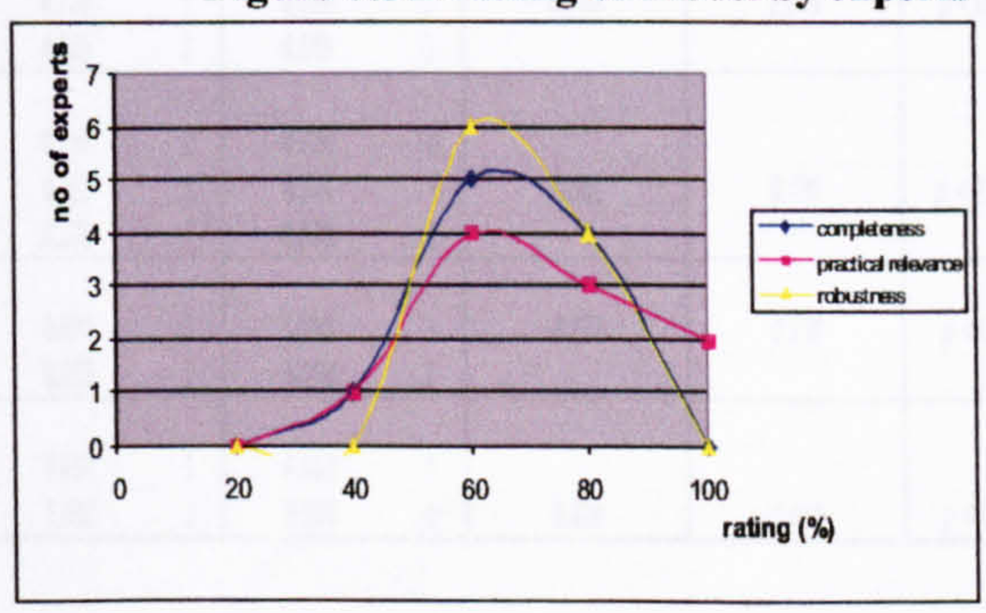
Those who participated in the initial survey were selected from a list of organisations active in the PPP procurement within the UK. The experts were chosen from a data base compiled by Centaur, containing the list of key organizations and individuals who are actively involved in the procurement of projects using the PPP/PFI strategy within the UK. Centaur are the publishers of the PFI Report and the principal organizers of major conferences and workshops on the PPP/PFI concept throughout the UK. They developed the database in conjunction with the HM Treasury. The database was arranged in a form of a league table in the order of number of signed contracts these organizations and institutions (both public and private) have participated in since the inception of the PFI/PPP concept within the UK in 1992.

From Table 6.5.7 and Figure 6.5.2 below, nine (9) out of the ten (10) experts rated the model between ***60-80%*** for *completeness,* seven (7) out of the ten (10) rated it between ***60-80%*** for *practical relevance*, while all ten (10) of them rated it between ***60-80%*** for *robustness.* Two (2) of the experts gave the model ***100%*** rating for *practical relevance.*

**Table 6.5.7 Distribution of the feedback scores by expert**

| rating | | number of experts rating model for: | | |
|---|---|---|---|---|
| score | % | completeness | practical relevance | robustness |
| 1 | 20 | 0 | 0 | 0 |
| 2 | 40 | 1 | 1 | 0 |
| 3 | 60 | 5 | 4 | 6 |
| 4 | 80 | 4 | 3 | 4 |
| 5 | 100 | 0 | 2 | 0 |
| Total | | 10 | 10 | 10 |

**Figure 6.5.2 Rating of Model by experts**



## 6.6 Analysis of Perceptual Differences

The third objective of the research was to find out if there were any significant perceptual differences between the private sector and the public sector clients on the significance of the respective attributes in contributing to the efficient and effective negotiation process of the PPP procurement. The main purpose is that by identifying and highlighting such areas of difference, the research will enhance a greater understanding of the importance these key stakeholders place on the respective attributes. This will not only help the parties to be able to better understand the concerns of each other, but to also quickly look at those areas that can help push the process forward faster and to pull resources together if necessary to unravel some of the contentious aspects right from the outset of the procurement process. This situation should help lead to minimising disputes during the implementation of the project.

In order to effectively assess these perceptual differences, the data set was split into two distinct groups each representing ratings from the private sector and the public sector respondents. Table 6.6.1 provides the summary statistics for testing these perceptual differences about the attributes. The sections that follow contain the detailed statistical analysis for the respective components.

**Table 6.6.1 Summary Statistics for testing perceptual differences between the Private and the Public Sectors**

| Main Components | Main Attributes | The Model Results (n =49) | | Sectors | | | | Spearman's Correlation Coefficient(*prvpub*) $\sigma$ | Kendall's Coefficient of Concordance(*prvpub*) *W* | Statistical test of significance (one-tail test) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Private Sector (n = 25) | | Public Sector (n = 24) | | | | |
| | | Relative Significance Index | Ranking | Relative Significance Index | Ranking | Relative Significance Index | Ranking | | | |
| The Consortium | *Nature and Strength* | 0.738 | 1 | 0.753 | 2 | 0.723 | 1 | | | |
| | *Quality of Technical Proposal* | 0.723 | 2 | 0.776 | 1 | 0.669 | 2 | **0.890** | 0.945 | $p < 0.001$ |
| | *Quality of the Financial Proposal* | 0.652 | 3 | 0.655 | 3 | 0.649 | 3 | | | |
| The Public Sector Client | *Organisational Capabilities* | 0.736 | 2 | 0.749 | 2 | 0.724 | 1.5 | | | |
| | *Technical Capabilities* | 0.739 | 1 | 0.753 | 1 | 0.724 | 1.5 | **0.562** | 0.781 | $p < 0.0025$ |
| | *Financial Capabilities* | 0.578 | 3 | 0.578 | 3 | 0.578 | 3 | | | |
| The Project | *Nature of Project* | 0.665 | 1 | 0.671 | 1 | 0.658 | 1 | **-0.875** | 0.938 | $p < 0.001$ |
| | *Marketability of Project* | 0.656 | 2 | 0.653 | 2 | 0.659 | 2 | | | |
| The External Environment | *Socio-Economic* | 0.673 | 1 | 0.694 | 1 | 0.652 | 1 | | | |
| | *Political/Legal/Regulatory Regime* | 0.623 | 2 | 0.650 | 2 | 0.595 | 2 | **0.820** | 0.910 | $p < 0.001$ |

The results of the analyses revealed very high level of correlation between the private and public sectors on the relative importance of the main attributes. The test statistics

were also significant with $p < 0.001$ for all the key components except that of the Project Attributes that recorded $p < 0.0025$. The statistical tests therefore show high degrees of agreement between the two sectors on the main attributes. However, a careful examination of the analysis revealed some differences in perception on some of the individual sub-attributes, the highlights of which are presented under the main components in the subsequent sections that follow. Further discussions on these differences have been covered in Chapter 7 (Discussions and Conclusions).

### 6.6.1 Consortium Attributes

The computations relating to the statistical analysis of the Consortium Attributes with respect to the perceptual differences between private and public sectors is presented in Appendix D. The sub-attributes on which they differ are presented in tabular and graphical forms hereunder.

#### *6.6.1.1 Organisational Nature and Strength*

Table 6.6.2 provides the rating and the ranking assigned to the respective attributes by the public and private sectors.

***Table 6.6.2 Private/Public sector rating of Consortium Attributes* – Organisational Nature & Strength**

| code | Attributes | Private Sector Rating | | | | Public Sector Rating | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | *i sub* | *r sub* | *i main* | *r main* | *i sub* | *r sub* | *i main* | *r main* |
| cs | ***Nature and Strength*** | | | **0.753** | 1 | | | **0.723** | 1 |
| cs1 | Previous experience in PPP | **0.848** | 4 | | | **0.733** | 10.5 | | |
| cs2 | Consortium's reputation | **0.720** | 12 | | | **0.683** | 13 | | |
| cs3 | PPP being a strategic business interest | **0.704** | 13.5 | | | **0.667** | 14 | | |
| cs4 | Ability to tie equity for a long period | **0.624** | 18 | | | **0.742** | 9 | | |
| cs5 | Readiness to accept risk | **0.808** | 8 | | | **0.825** | 4 | | |
| cs6 | Open/frank communication | **0.832** | 5 | | | **0.850** | 2 | | |
| cs7 | Commitment to earlier negotiated terms | **0.752** | 11 | | | **0.750** | 8 | | |
| cs8 | Current job holding | **0.624** | 18 | | | **0.583** | 17 | | |
| cs9 | Appointing a dedicated bid manager | **0.864** | 1.5 | | | **0.867** | 1 | | |
| cs10 | Understanding the public sector needs | **0.864** | 1.5 | | | **0.842** | 3 | | |
| cs11 | Ability to work harmoniously | **0.824** | 6 | | | **0.817** | 5 | | |
| cs12 | Previous experience as a team | **0.776** | 9.5 | | | **0.550** | 19 | | |
| cs13 | Proactive role in initiating the project | **0.656** | 15 | | | **0.600** | 16 | | |
| cs14 | Timely planning permission | **0.624** | 18 | | | **0.692** | 12 | | |
| cs15 | Early stakeholder involvement | **0.856** | 3 | | | **0.808** | 6.5 | | |
| cs16 | Champion's personal attributes | **0.776** | 9.5 | | | **0.733** | 10.5 | | |
| cs17 | Perseverance during negotiations | **0.816** | 7 | | | **0.808** | 6.5 | | |
| cs18 | Multidisciplinary team | **0.704** | 13.5 | | | **0.633** | 15 | | |
| cs19 | Previous experience with client | **0.632** | 16 | | | **0.558** | 18 | | |

*i = relative significance index, r ranking*

Figure 6.6.1 represents the ratings graphically.

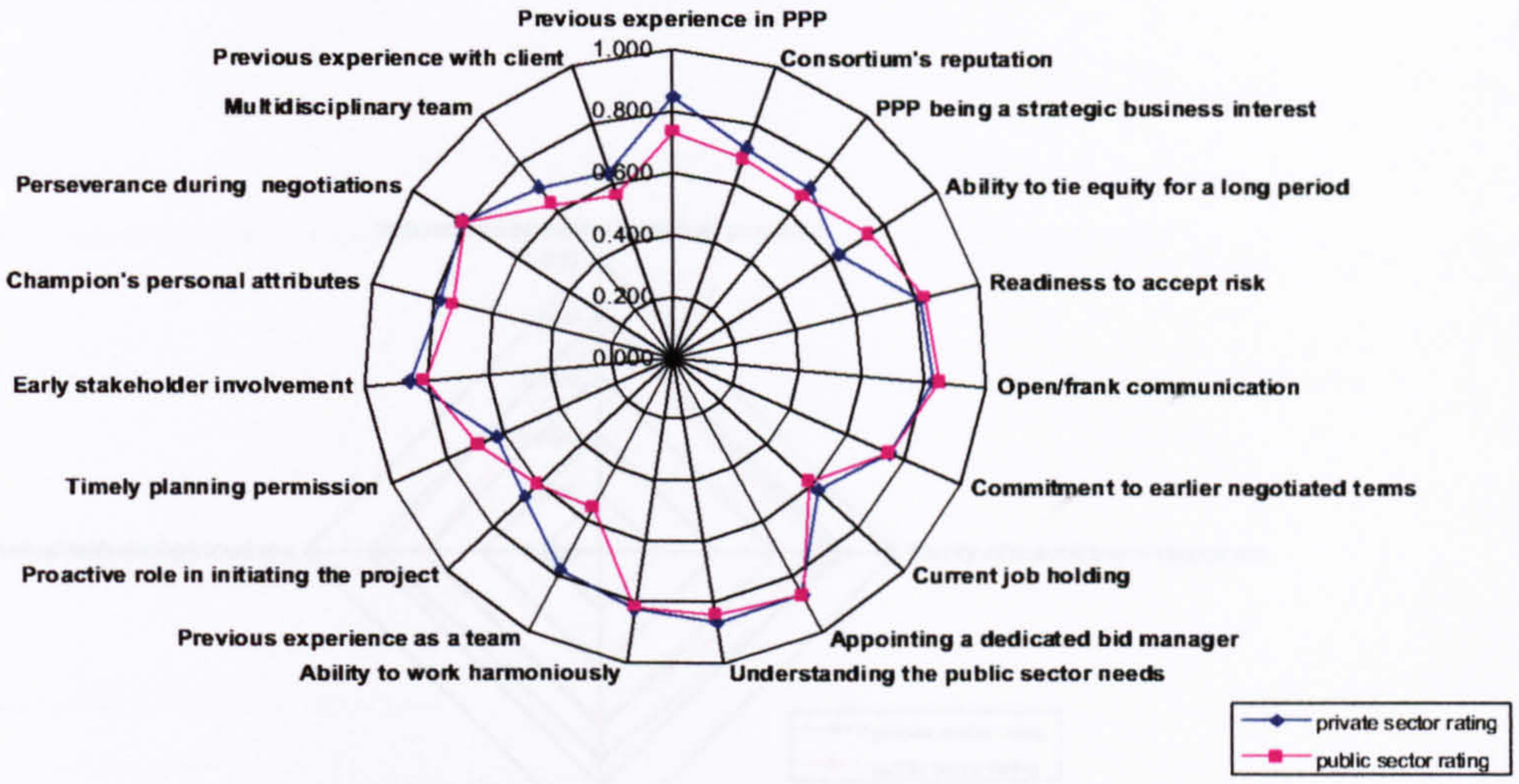



**Figure 6.6.1 Private/Public sector rating of Consortium Attributes – *Organisational Nature & Strength***

The statistical analysis confirmed a general agreement between the two sectors on the relative merit of the main attribute. However, some differences existed over some of the sub-attributes particularly the in respect to the experience sub-attributes.

### *6.6.1.2 Quality of Technical Proposals*

The differences in rating between the public and private sectors for the sub-attributes under the Quality of the Technical Proposals are as shown in Table 6.6.3.

**Table 6.6.3 Private/Public sector rating of Consortium Attributes – *Quality of Technical Proposals***

| code | Attributes | Private Sector Rating | | | | Public Sector Rating | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | *i sub* | *r sub* | *i main* | *r main* | *i sub* | *r sub* | *i main* | *r main* |
| ct | ***Quality of Technical Proposal*** | | | **0.776** | 2 | | | **0.669** | 2 |
| ct1 | Robustness of outline technical proposal. | **0.824** | 2 | | | **0.733** | 2 | | |
| ct2 | Clarity of submissions/responses | **0.832** | 1 | | | **0.767** | 1 | | |
| ct3 | Innovative technical solutions. | **0.704** | 4 | | | **0.575** | 4 | | |
| ct4 | Provision of sound technical guarantees | **0.744** | 3 | | | **0.600** | 3 | | |
| | ***i** = relative significance index, **r** ranking* | | | | | | | | |

Figure 6.6.2 also provides the graphical representation of the ratings by the private and public sectors of the sub-attributes relating to the Consortium's technical proposals. The ratings from both sectors were quite close but with some differences on some of the sub-attributes.

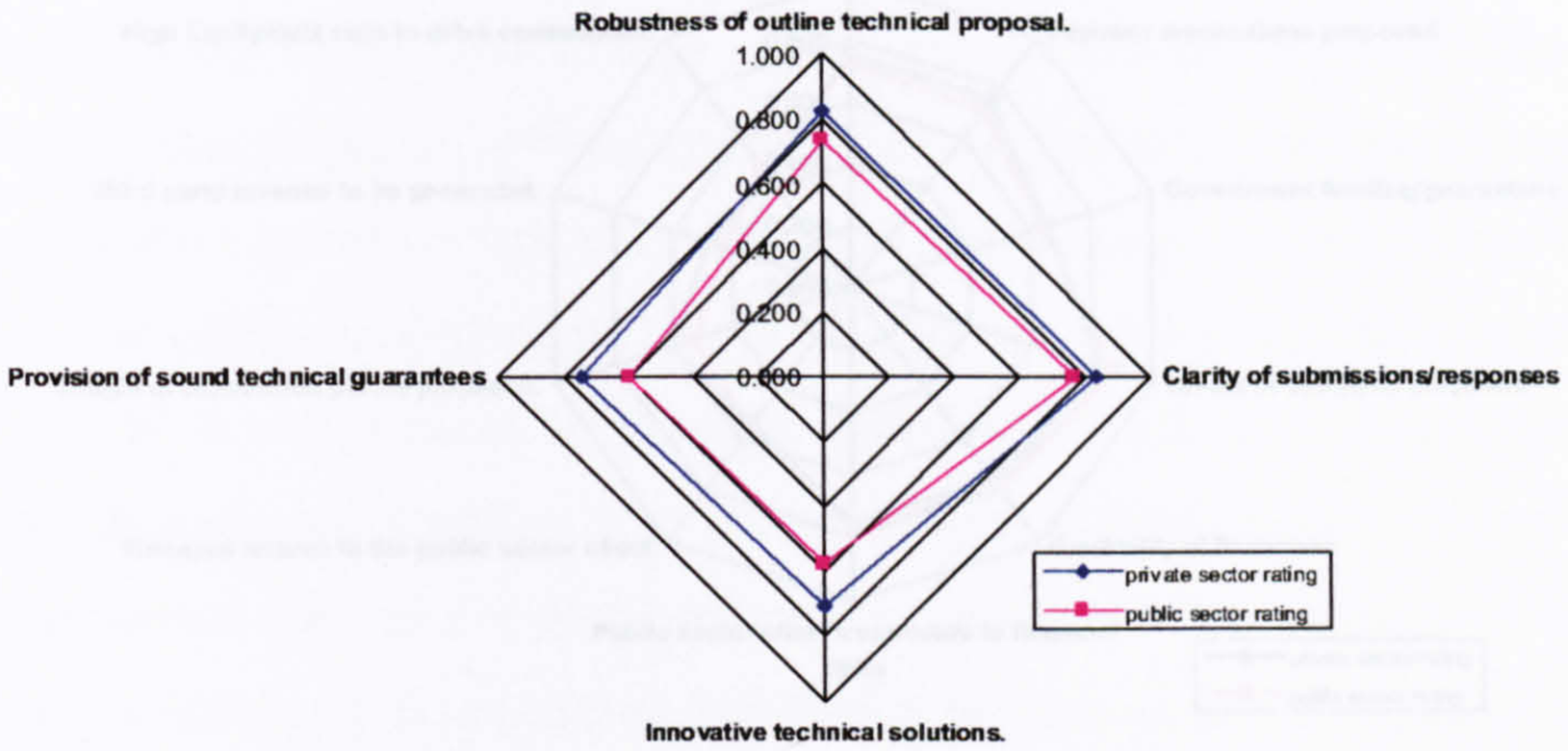



**Figure 6.6.2 Private/Public sector rating of Consortium Attributes – *Quality of Technical Proposals***

### *6.6.1.3 Quality of Financial Proposal*

Table 6.6.4 shows the differences in rating for the sub-attributes related to the Financial Proposals.

**Table 6.6.4 Private/Public sector rating of Consortium Attributes – *Quality of Financial Proposals***

| | Attributes | Private Sector Rating | | | | Public Sector Rating | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | *i sub* | *r sub* | *i main* | *r main* | *i sub* | *r sub* | *i main* | *r main* |
| code | ***Quality of the Financial Proposal*** | | | **0.655** | 3 | | | **0.649** | 3 |
| cf1 | Financial guarantees provided/proposed | **0.752** | 3.5 | | | **0.725** | 4 | | |
| cf2 | Payment mechanisms proposed | **0.752** | 3.5 | | | **0.708** | 5 | | |
| cf3 | Government funding/guarantees required. | **0.648** | 6 | | | **0.633** | 6 | | |
| cf4 | Levels of tariff/tolls proposed | **0.824** | 1 | | | **0.867** | 1 | | |
| cf5 | Credibility of financiers | **0.752** | 3.5 | | | **0.783** | 2 | | |
| cf6 | Public sector client's exposure to financial risks | **0.752** | 3.5 | | | **0.775** | 3 | | |
| cf7 | Financial returns to the public sector client. | **0.544** | 8 | | | **0.558** | 7 | | |
| cf8 | Length of concession period proposed. | **0.600** | 7 | | | **0.533** | 8 | | |
| cf9 | Third party revenue to be generated. | **0.480** | 9 | | | **0.425** | 10 | | |
| cf10 | High Equity/debt ratio to drive commitment. | **0.448** | 10 | | | **0.483** | 9 | | |

*i = relative significance index, r ranking*

Figure 6.6.3 gives an indication of the differences in opinion between the two sectors on the Consortium sub-attributes relating to the Quality of the Financial Proposals.

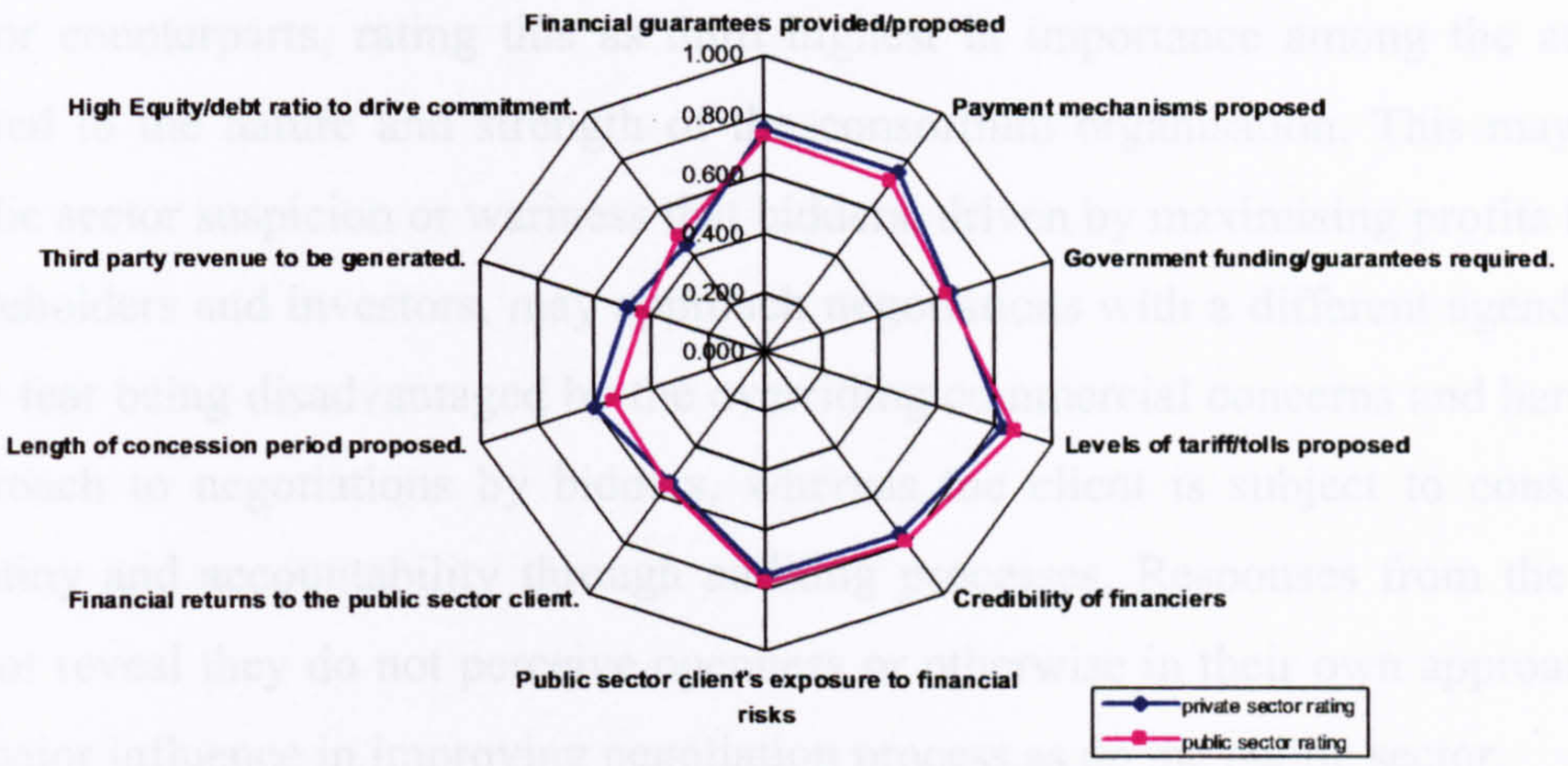



**Figure 6.6.3 Private/Public sector rating of Consortium Attributes – *Quality of Financial Proposals***

With respect to the Quality of the Financial Proposals there was a high level of consistency in rating between the two sectors except for minor variations on the sub-attributes.

The study clearly revealed that *Nature and strength* attributes of the private sector consortium are the source of most differences in opinion between the private sector consortium and the public sector procurer during the course of the tender negotiations. Half of the attributes in this category ranked quite differently between public and private sector respondents. In contrast, there was full agreement on the relative importance of those attributes related to the quality of bidders technical and design proposals. The quality of the financial proposals category highlighted some differences in opinion on relative importance of individual attributes, but no

substantial differences in their relative significance index. Discussions on particular attributes are detailed below.

- *Open and frank communications during negotiations*

Public sector attached considerably more importance to this attribute than their private sector counterparts, rating this as third highest in importance among the attributes related to the nature and strength of the consortium organisation. This may reflect public sector suspicion or wariness that bidders, driven by maximising profits for their shareholders and investors, may approach negotiations with a different agenda. They may fear being disadvantaged by the overriding commercial concerns and hard-nosed approach to negotiations by bidders, whereas the client is subject to considerable scrutiny and accountability through auditing processes. Responses from the private sector reveal they do not perceive openness or otherwise in their own approach to be of major influence in improving negotiation process as do the public sector.

- *Early involvement of stakeholders*

The private sector sees early involvement and commitment of stakeholders of greater importance than their public sector counterparts which is perhaps to be expected since they are responsible for forming the consortium. This can be a complex and time consuming process, often involving a large number of participants required in the funding, design and procurement of the asset as well as service delivery for the length of the concession. The public sector, acting as enablers, has largely divested themselves of these responsibilities to focus on the service actually being delivered which is consistent with PPP philosophy.

- *Readiness to accept risk*

The public sector appears much more concerned about the consortium's readiness to accept risk. The public sector has been criticised by the National Audit Office (NAO) in some early projects for not demonstrating sufficient transfer of risk, and thus not obtaining sufficient value for money for the taxpayer. This has been uppermost in UK Treasury thinking since the outset of the initiative in 1992. As a key value for money test, the client will be keen to establish the consortium's acceptance of as many risks as possible early in the negotiations. Naturally, the consortium will be equally keen

not to expose themselves to too much risk. Experience has shown that the public sector has had to concede ground here in order to progress projects.

- *Consortium's previous experience in PPP procurement*

The private sector rates this considerably more important than public sector. Again, the public sector's lesser degree of concern is to be expected since they are negotiating primarily on levels of output service and pricing. In principle it is not their concern how this is brought about which is compatible with PPP thinking. The private sector, on the other hand, will be concerned as to the experience of all the various elements of the consortium since an experienced and able consortium team reduces risk involved in delivering the asset and the resulting services, and in meeting their contractual commitments efficiently and profitably.

- *Willingness to commit to earlier negotiated terms*

The public sector places significantly higher premium on the consortium willingness to commit to earlier negotiated terms. Clearly, they will be keener to tie the consortium down to contractual terms as early as possible. Price certainty and fixed budgets are traditionally important in public sector procurement, and as affordability limits are established early in the PPP process, the client will value early commitment. The consortium will naturally be reluctant to commit to terms early on, when much of the design remains to be developed and the many unknowns mean there is greater exposure to risk.

- *Ability to tie equity into the project for a long period of time.*

The public sector rates this attribute much higher than the private sector on the possible ground that willingness of the private sector consortium of not only providing equity but also with a commitment to tie it to the project for a long period is an indication of their level of commitment to the project. Equity represents the consortium members' own source of funding towards the project unlike the others that may be coming from sources like the banks and other financial institutions.

- *Experience of consortium previously working together as a team.*

Previous experience of PPP procurement within the consortium is of greater importance to the consortium itself than it is to the client, because it largely influences how successful they are in efficient and profitable delivery of service. Previous experience of teamwork is a well-acknowledged factor of successful construction project management. In contrast, the public sector client is focussed on the service that the consortium team is ultimately contracting to deliver.

- *Ability to obtain planning permission timeously*

Public sector attaches rather more importance to this attribute. It is a feature of many projects that the responsibility, and therefore the risk associated with obtaining outline planning permission is retained by the public sector. Although detailed planning permission for the design remains within the consortium this is perhaps more straightforward to secure since any major planning issues will have been resolved by this stage.

### 6.6.2 Public Sector Client Attributes

The statistical computations for the perceptual differences between the two sectors for the Public Sector Client Attributes are presented Appendix D. The computations reflect high levels of correlation or agreement overall but with some variations in the rating and ranking of the individual sub-attributes.

#### *6.6.2.1 Organisational Capabilities*

The ratings for the both sectors are presented in Table 6.6.5 overleaf. Generally, both sectors were in close agreement on the significance of the organisational capability attributes in taking the PPP procurement process forward. There however some differences with some of the individual sub-attributes.

**Table 6.6.5 Private/Public sector rating of Public Sector Client Attributes – *Organisational Capabilities***

| code | Attributes | Private Sector Rating | | | | Public Sector Rating | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | *i sub* | *r sub* | *i main* | *r main* | *i sub* | *r sub* | *i main* | *r main* |
| | ***Organisational Capabilities*** | | | **0.749** | 2 | | | **0.724** | 1.5 |
| po1 | Ability to effectively sensitise public opinion | **0.720** | 6 | | | **0.650** | 9 | | |
| po2 | Level of reputation enjoyed by the organisatio | **0.624** | 12 | | | **0.642** | 10 | | |
| po3 | Level of bureaucracy in the decision making p | **0.760** | 5 | | | **0.733** | 4.5 | | |
| po4 | Right attitude to cost | **0.696** | 10.5 | | | **0.692** | 7.5 | | |
| po5 | Top level commitment | **0.920** | 1 | | | **0.883** | 2 | | |
| po6 | Team collaboration and commitment | **0.832** | 3 | | | **0.900** | 1 | | |
| po7 | Open/frank and flexible communication | **0.840** | 2 | | | **0.858** | 3 | | |
| po8 | Pre-established PPP Unit | **0.712** | 7 | | | **0.558** | 12 | | |
| po9 | Assisting in land acquisition and in obtaining p | **0.704** | 8.5 | | | **0.692** | 7.5 | | |
| po10 | Tapping knowledge and expertise gained else | **0.704** | 8.5 | | | **0.625** | 11 | | |
| po11 | Commitment to earlier negotiated terms | **0.776** | 4 | | | **0.717** | 6 | | |
| po12 | Ability to accept and absorb risks | **0.696** | 10.5 | | | **0.733** | 4.5 | | |

*i = relative significance index, r ranking*

Although there was a close agreement on the main attribute, differences existed on some of the sub-attributes as shown in Figure 6.6.4 below.

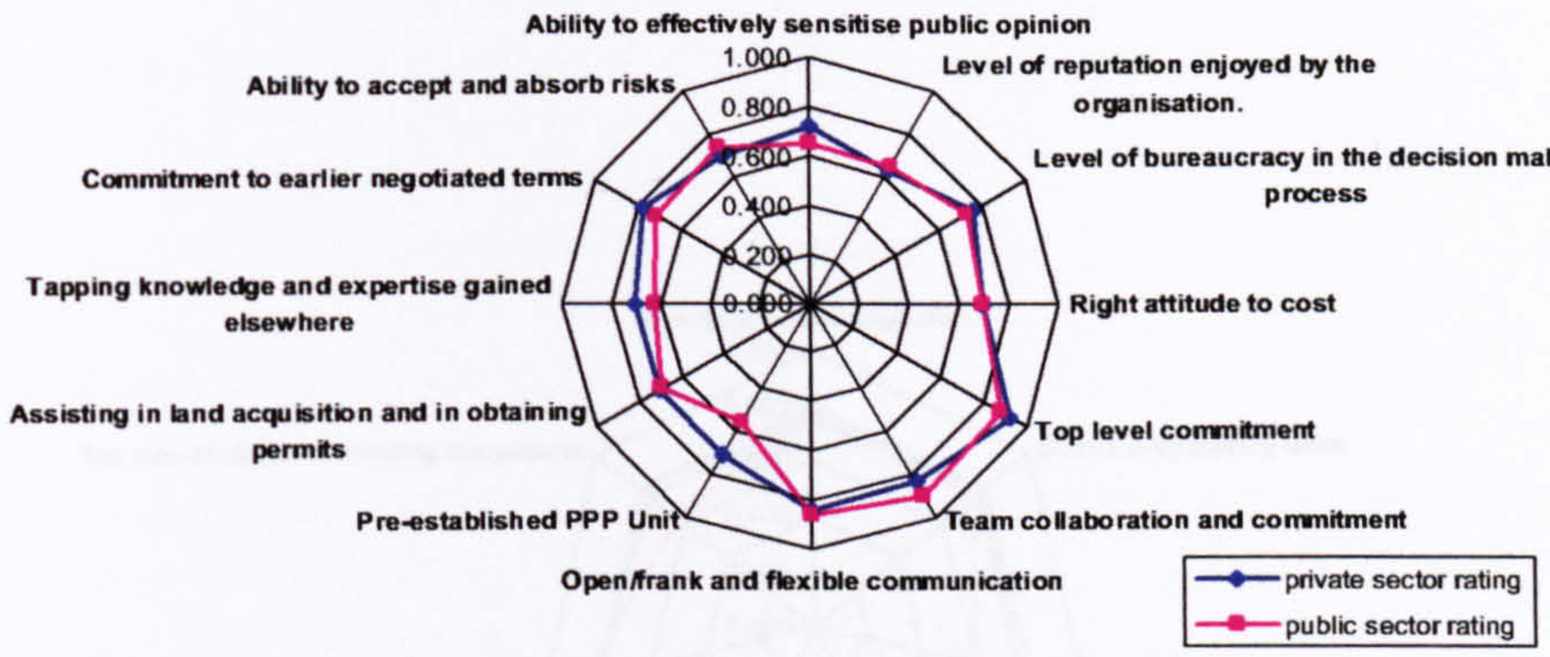



**Figure 6.6.4 Private/Public sector rating of Public Sector Client Attributes – *Organisational Capabilities***

### *6.6.2.2 Technical Capabilities*

Although, statistically there was agreement between the private sector and the publics sector on the significance of the Technical Capabilities of the Public Sector Clients, there some significant differences on two of the sub-attributes. The marked differences were on the attribute relating to the public sector client's previous experience in PPP procurement.

The second sub-attribute on which they differed significantly is the use of standard bidding documents. The private sector respondents regarded these two sub-attributes as much more important as compared to the importance the public sector attached to them. Whilst the private sector gave them a similar rating of 0.752 and thus giving them ranked them at the forth among the seven sub-attributes, the public sector rated them 0.600 and 0.625 respectively and which ranked them as seventh and sixth respectively. Details of these are presented in Table 6.6.6

**Table 6.6.6 Private/Public sector rating of Public Sector Client Attributes – *Technical Capabilities***

| code | Attributes | Private Sector Rating | | | | Public Sector Rating | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | *i sub* | *r sub* | *i main* | *r main* | *i sub* | *r sub* | *i main* | *r main* |
| pt | ***Technical Capabilities*** | | | **0.753** | 1 | | | **0.724** | 1.5 |
| pt1 | Strong in-house expertise | **0.768** | 2.5 | | | **0.750** | 3.5 | | |
| pt2 | Sound preparatory work | **0.768** | 2.5 | | | **0.750** | 3.5 | | |
| pt3 | Previous experience in PPP procurement | **0.752** | 4.5 | | | **0.600** | 7 | | |
| pt4 | Experience in infrastructure procurement | **0.680** | 7 | | | **0.717** | 5 | | |
| pt5 | Clearly established evaluation criteria | **0.744** | 6 | | | **0.775** | 2 | | |
| pt6 | Clear output specifications | **0.808** | 1 | | | **0.850** | 1 | | |
| pt7 | The use of standard bidding documents | **0.752** | 4.5 | | | **0.625** | 6 | | |
| *i = relative significance index, r ranking* | | | | | | | | | |

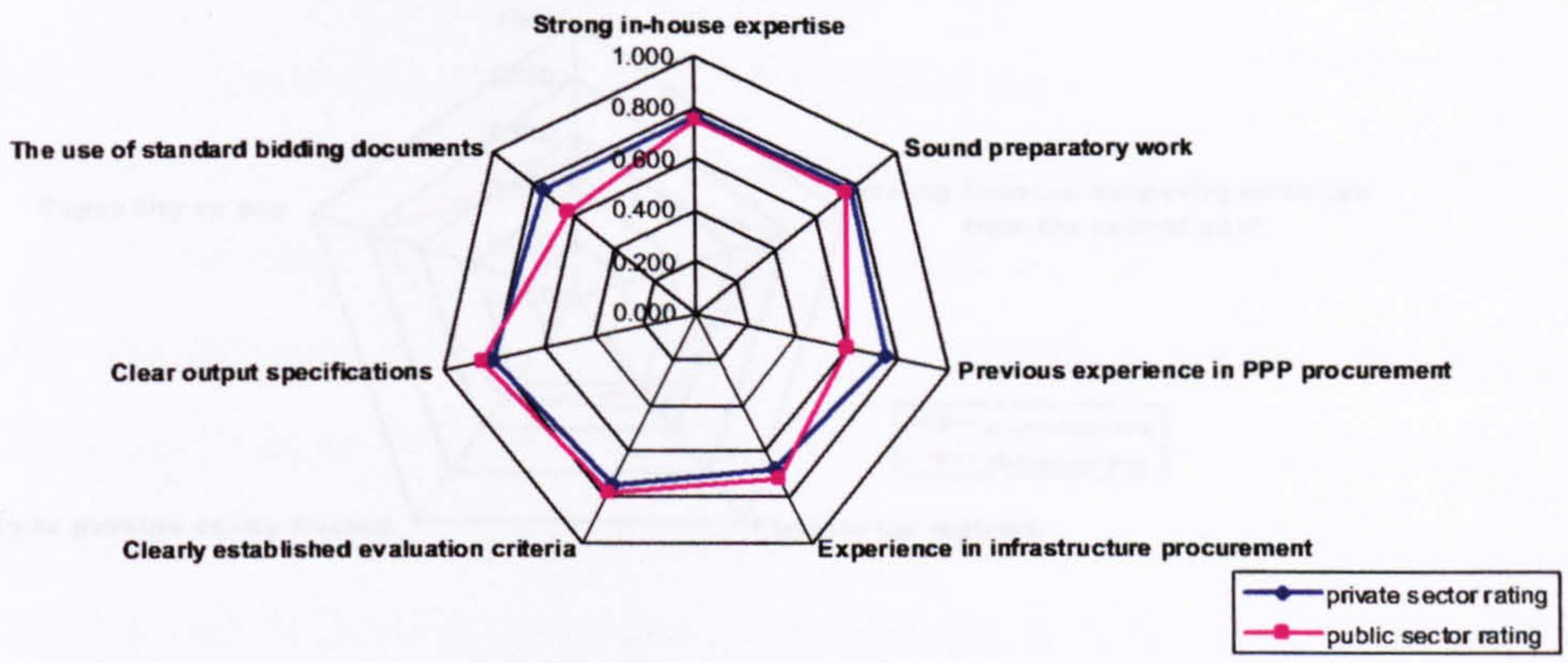



**Figure 6.6.5 Private/Public sector rating of Public Sector Client Attributes – *Technical Capabilities***

Figure 6.6.5 illustrates the differences in perception between these two sectors on the sub-attributes.

### *6.6.2.3 Financial Capabilities*

Statistically, there was very high level of agreement between the two sectors on the significance of the Public Sector Client's financial capabilities in influencing the negotiation process.

**Table 6.6.7 Private/Public sector rating of Public Sector Client Attributes – *Financial Capabilities***

| code | Attributes | Private Sector Rating | | | | Public Sector Rating | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | *i sub* | *r sub* | *i main* | *r main* | *i sub* | *r sub* | *i main* | *r main* |
| pf | ***Financial Capabilities*** | | | **0.578** | 3 | | | **0.578** | 3 |
| pf1 | Ability to raise funds through Bonds. | **0.416** | 5 | | | **0.500** | 3 | | |
| pf2 | Strong financial support/guarantees from the central govt | **0.752** | 2 | | | **0.742** | 2 | | |
| pf3 | Flexible tax regimes. | **0.512** | 3 | | | **0.417** | 5 | | |
| pf4 | Ability to provide equity finance. | **0.440** | 4 | | | **0.467** | 4 | | |
| pf5 | Capability to pay | **0.768** | 1 | | | **0.767** | 1 | | |
| *i = relative significance index, r ranking* | | | | | | | | | |

Difference however, existed between on them on two of the sub-attributes. These were the ability of the public sector client to raise bonds and the provision of flexible tax regimes specific to the project. These are shown in Table 6.6.7 above and Figure 6.6.6 below.

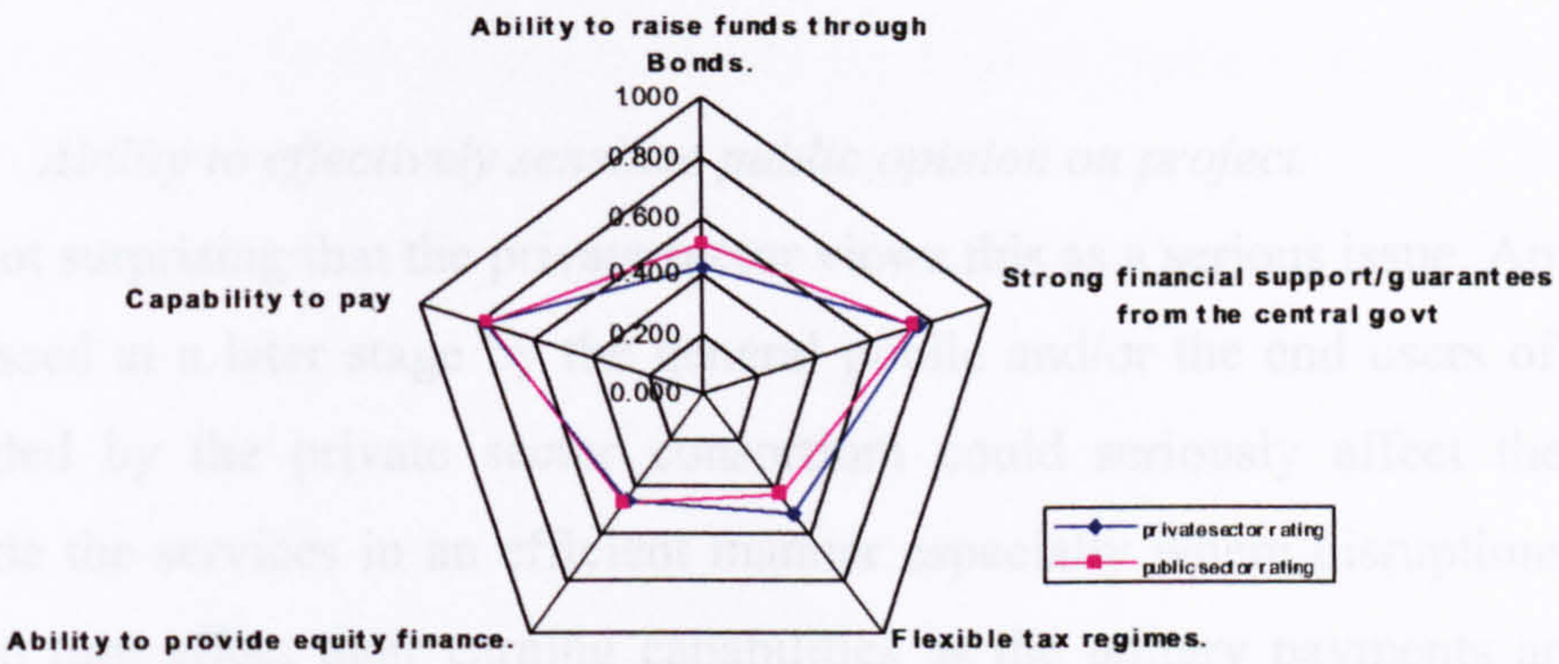



**Figure 6.6.6 Private/Public sector rating of Public Sector Client Attributes – *Financial Capabilities***

Regarding public sector client qualities, there was broad agreement on the ranking of importance for the various descriptive attributes. The public and private sector perspectives differ significantly for only a small number of attributes relating to the organisational and technical capabilities of the client (5 out of 19 attributes). There was complete agreement on the relative importance of attributes relating to the financial capabilities of the client.

- *Ability to accept and absorb risks*

The public sector is considerably more sensitive about their own ability to accept their share of project risks. This may reflect the attention given by the Treasury to the whole issue of risk transfer away from the client - an important feature of the PPP ideology. The public sector clients have been criticised for not adequately demonstrating value for money through sufficient transfer of risk in a number of PPP projects. Certain design and operational risks will remain with the public sector. The private sector does not attach such significance to the client's ability to accept and absorb risks; they are far more concerned about the project management strength of the organisation they will be negotiating with.

- *Ability to effectively sensitise public opinion on project*

It is not surprising that the private sector views this as a serious issue. Any misgivings expressed at a later stage by the general public and/or the end users of the services provided by the private sector consortium could seriously affect their ability to provide the services in an efficient manner especially where disruptions occur. This will in turn affect their earning capabilities as the unitary payments are tied to the quality and volume of service provided. The funding institutions are also equally worried about the public acceptability of projects and would only invest in those projects where there is clear assurance that there will not be any disruptions.

- *Existence of established PPP unit.*

It is not surprising that the private sector is more concerned to see an established PPP unit within the client organisation. A PPP unit suggests an experienced and able client team that has the power and authority necessary for an effective negotiation process. The absence of such a unit may raise concerns about the public sector's project

management strengths. This will be particularly pertinent where the functions of the public sector client are fragmented across a number of departments.

- *Ability to establish clear statements of evaluation criteria in bidding documents.*

The public sector exhibits greater concern here. Accountability and transparency are key watchwords for any public sector organisation involved in major infrastructure procurement. Clearly established evaluation criteria should therefore be seen as achieving these twin objectives since the end result should ultimately lead to the choice of an optimal bid that should result in value for money in the long run.

- *Previous experience in PPP procurement*

The private sector appears more concerned about the experience, and by implication, ability and effectiveness of the body with which they will be negotiating and making decisions. Experience provides expertise through learning, which then reflects in the quality of the discussions during the negotiations. With the private sector bidding costs being extremely high for PPP project procurement compared to those of the other traditional forms, it is natural that the bidders desire to work with a team that knows what it is about and is able to progress the process speedily. To the private sector, time is money and delays therefore represent lost opportunities.

### 6.6.3 Project Attributes

The project attributes were identified under two main categories – the nature of the project, and its marketability. The statistical computations for the perceptual differences in opinion on the significance of these attributes have been include under Appendix D. The agreement between the two sectors was very high. However, there were differences between them on some of the sub-attributes.

### *6.6.3.1 Nature of Project*

Table 6.6.8 gives an indication of how the two sectors respectively view the significance of the project nature attributes.

**Table 6.6.8 Private/Public sector rating of Project Attributes – *Project Nature***

| code | Attributes | Private Sector Rating | | | | Public Sector Rating | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | *i sub* | *r sub* | *i main* | *r main* | *i sub* | *r sub* | *i main* | *r main* |
| | ***Nature of Project*** | | | **0.671** | 1 | | | **0.658** | 1 |
| pn1 | Size and complexity | **0.776** | 1.5 | | | **0.800** | 1 | | |
| pn2 | Amenability to innovation | **0.648** | 8 | | | **0.600** | 7.5 | | |
| pn3 | Project risks | **0.760** | 3 | | | **0.758** | 2 | | |
| pn4 | Impact on the environment | **0.664** | 6.5 | | | **0.600** | 7.5 | | |
| pn5 | Third party improving existing infrastructure | **0.544** | 11 | | | **0.583** | 9.5 | | |
| pn6 | Health and safety provoked | **0.560** | 10 | | | **0.608** | 6 | | |
| pn7 | Design completion required at tender. | **0.720** | 4 | | | **0.683** | 5 | | |
| pn8 | Ability to respond to future changes. | **0.776** | 1.5 | | | **0.742** | 3 | | |
| pn9 | Location and site conditions | **0.672** | 5 | | | **0.717** | 4 | | |
| pn10 | Uniqueness of project | **0.664** | 6.5 | | | **0.583** | 9.5 | | |
| pn11 | Effect on existing public sector staff | **0.600** | 9 | | | **0.567** | 11 | | |
| | *i = relative significance index, r ranking* | | | | | | | | |

The perceptual differences are represented in Figure 6.6.7 below.

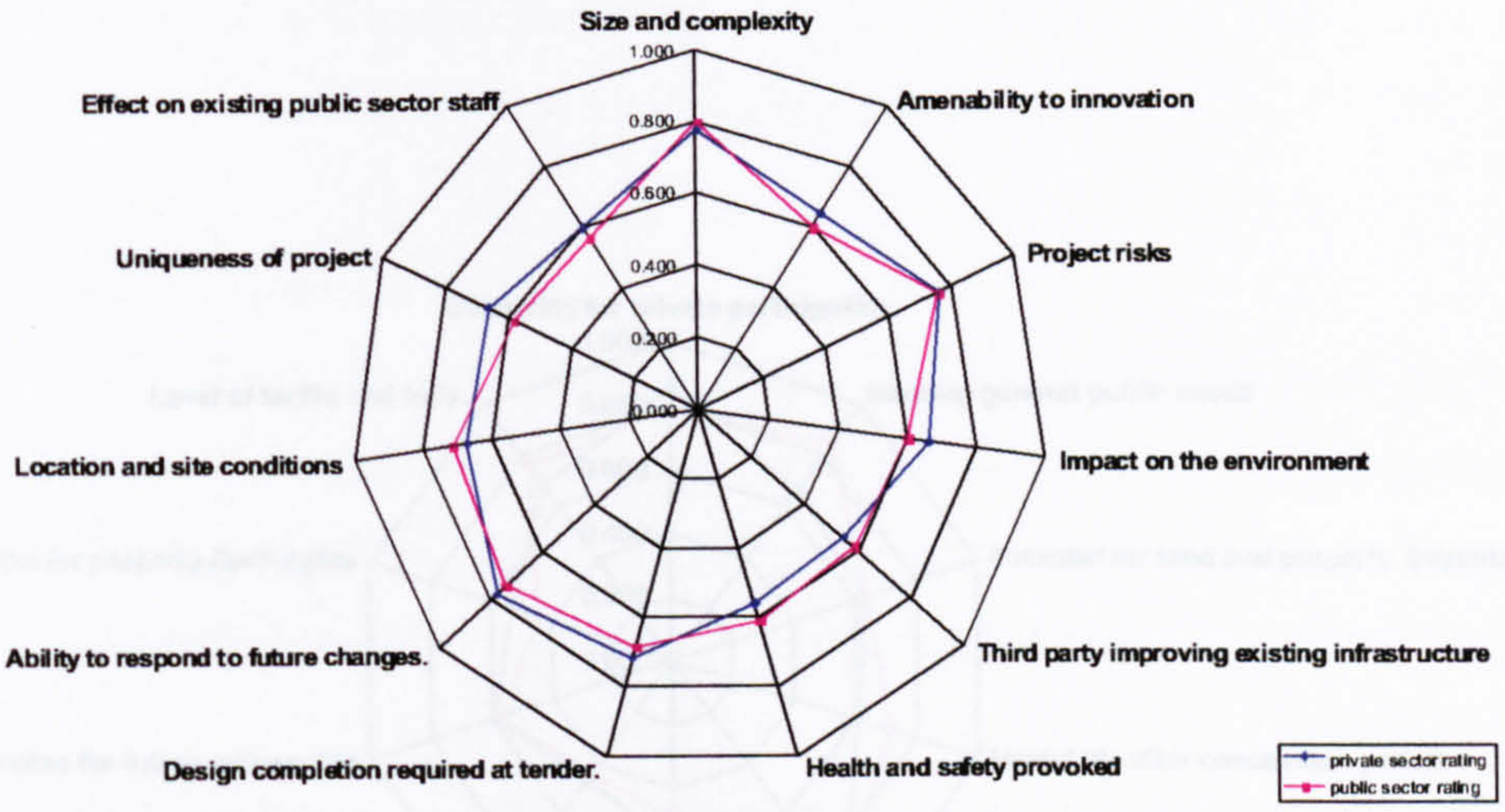



**Figure 6.6.7 Private/Public sector rating of Project Attributes – *Nature of Project***

### *6.6.3.2 Marketability of Project*

The ratings of the two sectors are represented in Table 6.6.9.

**Table 6.6.9 Private/Public sector rating of Project Attributes – *Marketability***

| code | Attributes | Private Sector Rating | | | | Public Sector Rating | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | *i sub* | *r sub* | *i main* | *r main* | *i sub* | *r sub* | *i main* | *r main* |
| pm | ***Marketability of Project*** | | | **0.653** | 2 | | | **0.659** | 2 |
| pm1 | Suitability for private participation | **0.856** | 2 | | | **0.792** | 3 | | |
| pm2 | Meeting general public needs | **0.664** | 4 | | | **0.850** | 2 | | |
| pm3 | Potential for land and property buyouts. | **0.632** | 5 | | | **0.642** | 6 | | |
| pm4 | Useful life after concession period. | **0.608** | 6 | | | **0.717** | 5 | | |
| pm5 | Bankability of project | **0.904** | 1 | | | **0.875** | 1 | | |
| pm6 | Monopolistic advantage potential | **0.584** | 8 | | | **0.492** | 8 | | |
| pm7 | Third party revenue potentials | **0.464** | 10 | | | **0.442** | 10 | | |
| pm8 | Opportunities for future refinancing | **0.592** | 7 | | | **0.575** | 7 | | |
| pm9 | Potential for property dev't rights | **0.536** | 9 | | | **0.450** | 9 | | |
| pm10 | Level of tariffs and tolls. | **0.688** | 3 | | | **0.758** | 4 | | |
| *i = relative significance index, r ranking* | | | | | | | | | |

Figure 6.6.8 shows the level of perceptual differences between the private and public sectors on the sub-attributes for the project's marketability.

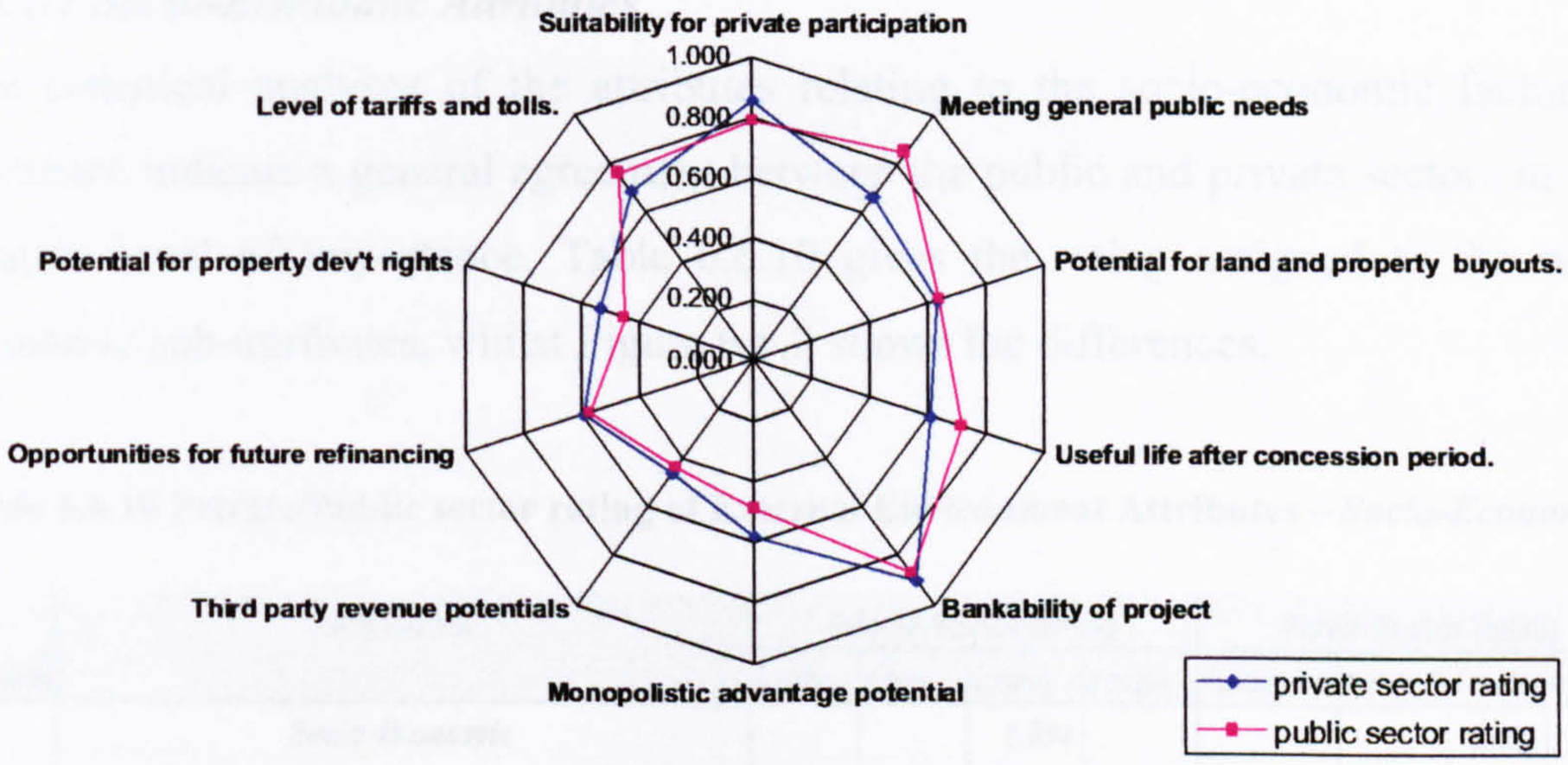



**Figure 6.6.8 Private/Public sector rating of Project Attributes – *Marketability***

Although the test statistics showed agreement between the public and private sectors on the relative importance of the main project attributes, the sub-attributes within the relating to the project's marketability area where there were some marked differences. The most significant difference related to the level to which the project must meet general public needs. The public sector client is obviously representing the interest of the public; hence their emphasis on this sub-attribute is higher than that of the private sector. Another area of significance difference is the potential for property development rights where emphasis is being placed by the private sector more than the public sector. This is obvious as the private sector would be looking out for other investment opportunities within the project to make it more attractive to the funding institutions.

### 6.6.4 External Environment Attributes

The statistical tests for the External Environment Attributes on the perceptual difference are included in Appendix D. The assessment of the two sectors was considered under the two broad categories identified in the model. These were socio-economic attributes and the political and legal/regulatory regime.

#### *6.6.4.1 Socio-Economic Attributes*

The statistical analyses of the attributes relating to the socio-economic factors of influence indicate a general agreement between the public and private sectors in their relative level of importance. Table 6.6.10 gives the rating assigned to the socio-economic sub-attributes, whilst Figure 6.6.9 shows the differences.

**Table 6.6.10 Private/Public sector rating of External Environment Attributes – *Socio-Economic***

| code | Attributes | Private Sector Rating | | | | Public Sector Rating | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | *i sub* | *r sub* | *i main* | *r main* | *i sub* | *r sub* | *i main* | *r main* |
| | ***Socio-Economic*** | | | **0.694** | 1 | | | **0.652** | 1 |
| es1 | Availability of traditional projects. | **0.592** | 5 | | | **0.608** | 4 | | |
| es2 | Maturity of the financial markets. | **0.760** | 1.5 | | | **0.708** | 1 | | |
| es3 | Perceived future economic uncertainties | **0.680** | 3.5 | | | **0.683** | 2.5 | | |
| es4 | Potential for future equity purchase in PPP pjts | **0.680** | 3.5 | | | **0.575** | 5 | | |
| es5 | Strong public/private sector relationships. | **0.760** | 1.5 | | | **0.683** | 2.5 | | |
| *i = relative significance index, r ranking* | | | | | | | | | |

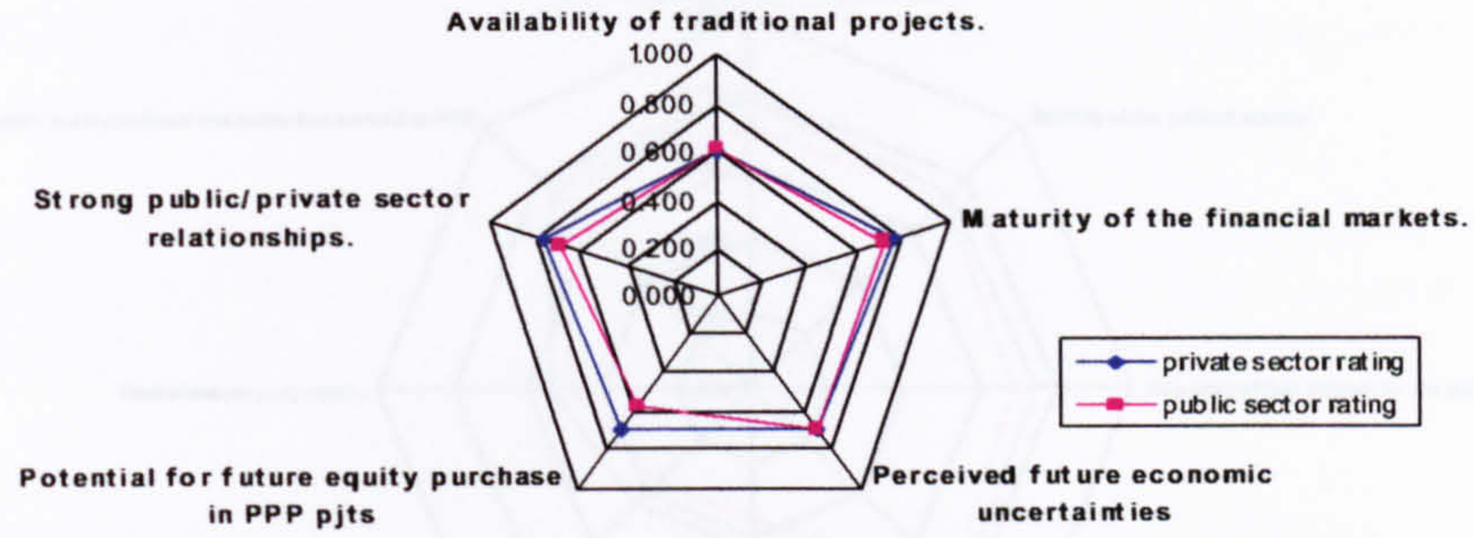



**Figure 6.6.9 Private/Public sector rating of External Environment Attributes – *Socio-Economics***

### *6.6.4.2 Political and Legal/Regulatory Regime*

Table 6.6.11 represents the rating of the two sectors on the sub-attributes under political and legal/regulatory.

**Table 6.6.11 Private/Private sector rating of External Environment Attributes – *Political and Legal/Regulatory Regime***

| code | Attributes | Private Sector Rating | | | | Public Sector Rating | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | *i sub* | *r sub* | *i main* | *r main* | *i sub* | *r sub* | *i main* | *r main* |
| ep/el | ***Political /Legal/Regulatory regime*** | | | **0.650** | 2 | | | **0.595** | 2 |
| ep1 | Public acceptability of the PPP philosophy. | **0.776** | 1 | | | **0.700** | 4 | | |
| ep2 | Stability of the political system. | **0.736** | 5 | | | **0.717** | 3 | | |
| ep3 | All-party political support for the philosopy | **0.752** | 3.5 | | | **0.683** | 5 | | |
| el1 | Clearly defined planning and regulatory frameworks. | **0.768** | 2 | | | **0.733** | 2 | | |
| el2 | Ability of foreign investors to repatriate earnings. | **0.440** | 7.5 | | | **0.350** | 8 | | |
| el3 | Clear regulations on foreign ownership of property. | **0.440** | 7.5 | | | **0.358** | 7 | | |
| el4 | Intellectual property rights. | **0.536** | 6 | | | **0.475** | 6 | | |
| el5 | Established institutional and policy frameworks on PPP | **0.752** | 3.5 | | | **0.742** | 1 | | |

*i = relative significance index, r ranking*

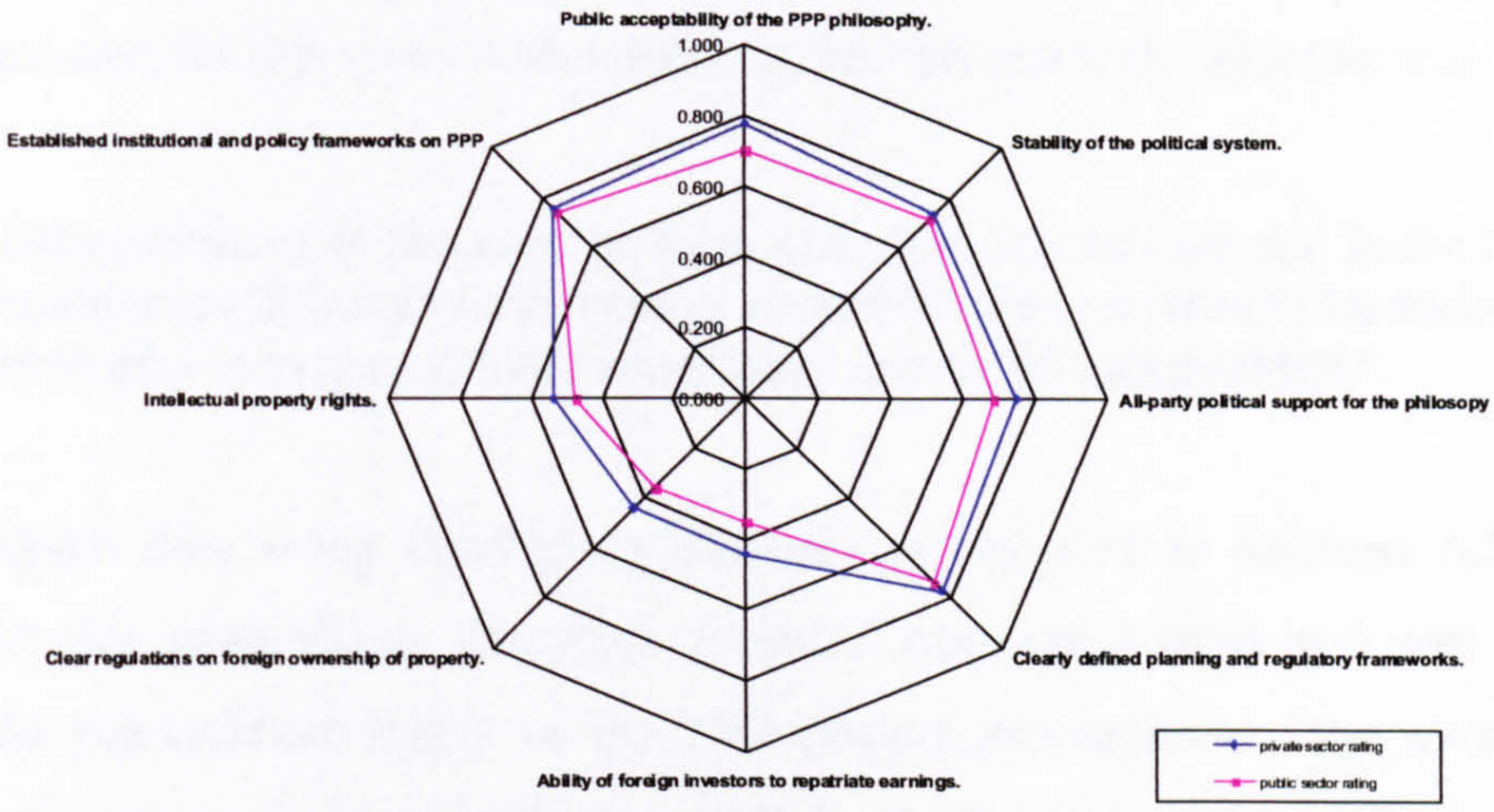



**Figure 6.6.10 Private/Private sector rating of External Environment Attributes – *Political and Legal/Regulatory Regime***

There was a broad agreement between the two sectors on the relative significance of the key external environment attributes. However two sub-attributes - the potential for future equity purchase in PPP projects, and an exhibition of strong public/private sector relationships, were the areas where the two sectors differed significantly on the socio-economic attributes. While the public sector played down on the importance of the project having the potential of generating future equity interest, the private sector placed much more emphasis on this. This is not surprising as recent events indicate that the public sector clients were not very happy with the sort of windfall profits the private sector started making on some of the early PPP/PFI projects through refinancing (The PFI Report, 2001). For the political and legal/regulatory regime, though the relative ratings for the sub-attributes were very close, the main area of difference related to public acceptability of the philosophy where the private sector placed a higher premium, and established institutional and policy frameworks on the PPP where the public sector placed higher emphasis.

## 6.7 Summary

### 6.7.1 Research Proposition (a)

The proposition for this study with respect to the first research objective was that:

> "The twin problems of pre-contract time and cost overruns are real in the PPP infrastructure procurement and therefore remain a serious issue to be addressed if the philosophy is to gain general acceptance among all stakeholders".

The analysed data using descriptive statistics as reported in sections 6.3, clearly confirmed this proposition. The data revealed substantial time and cost overruns during the pre-contract stages of the PPP project procurement. The average time overruns for the projects studied were ***38%*** for Civil Engineering projects, ***50%*** for Health projects and ***64%*** for School projects. In some instances the time overruns were as high as ***100 to 300%.*** In absolute terms, the overall times taken to take the projects to contract signing stage were in the range of ***12 to 60 months***. The bidding/pre-contract cost overruns were found to be equally high, with one project recording as high as ***200%*** overrun to the private sector. Not only were the overruns high but also cost in monetary terms to the private sector was high from a range of ***£0.1m to £6.0m.*** The public sector costs were equally high, ranging from ***£0.4 to £8m*** These findings confirm earlier reported delays as outlined in the literature review and that of a very recent one in the Financial Times that Jarvis has experienced delays and dissatisfaction with some of its biggest schools PFI projects due to delays in the bidding process and increasing bidding costs, a situation which is reducing their profits by as much £12m in their financial year 2003 (FT, 2004).

### 6.7.2 Research Proposition (b)

The proposition for the second research objective posits that:

> "A generic model can be developed to capture in a hierarchical order of significance the key attributes that positively influence the efficient and effective implementation of the negotiations phase of the PPP procurement process in terms of minimising times and cost overruns to the parties".

The statistical analyses as presented in Section 6.4 and reported in Table 6.4.1 indicate that this proposition is supported. The test statistics showed very high levels of significance throughout with $p < 0.001$. The validation exercises carried out and reported in Section 6.5 and Table 6.5.1 on the model also confirm the reliability of the model in terms of its practical relevance to industry, comprehensiveness and robustness. The feedback from experts confirm the usefulness of the model as a practical guide in identifying competency gaps within organisations attempting to procure projects using the PPP strategy.

### 6.7.3 Research Proposition (c)

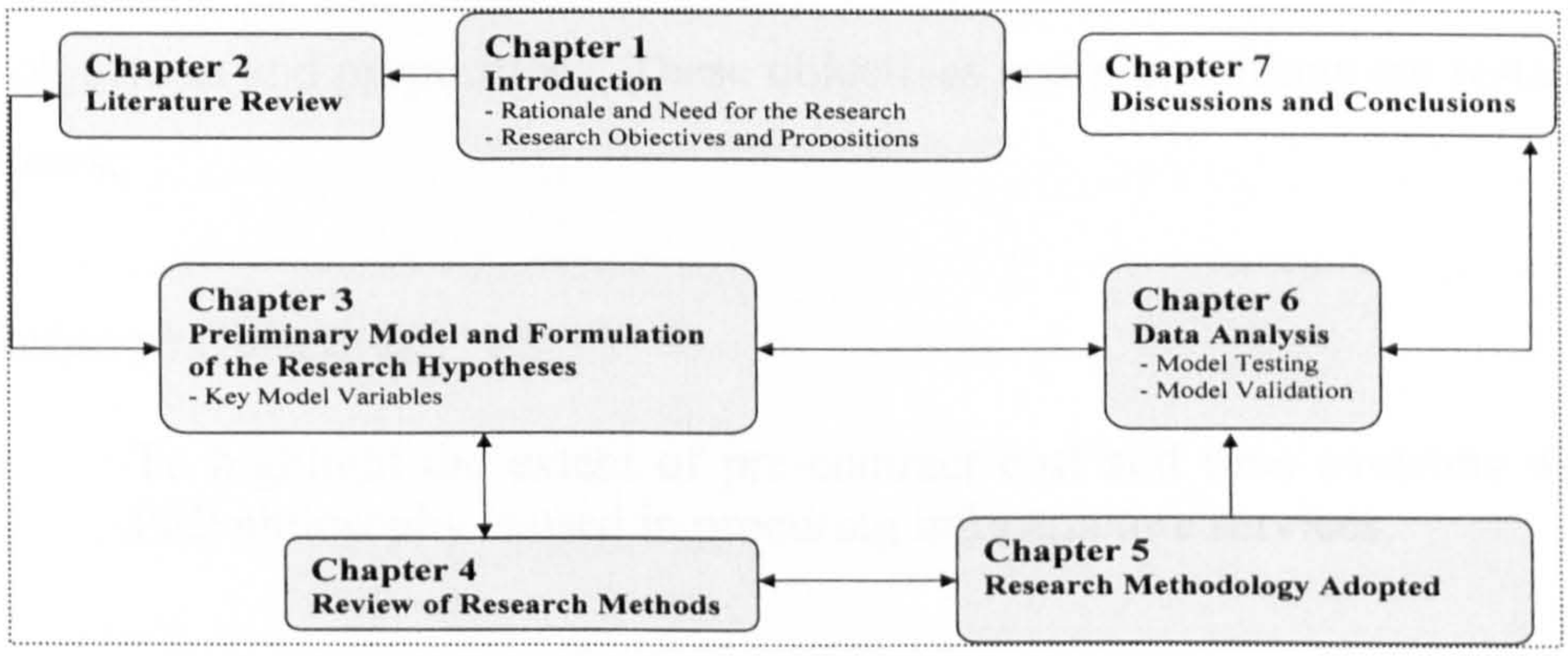
The proposition for the third objective was that:

> "Though there is a broad agreement between the key stakeholders (the public and private sectors), on the relative significance of the main attributes of the Consortium, the Public Sector Client, the Project, and the External Environment on the outcome of the PPP contract negotiations, differences do exist amongst them on the underlying dimensions to these main influence centres".

This third proposition was also supported by the various statistical analyses carried out and reported in Section 6.6. The test statistics revealed very high levels of agreement between the two sectors on the relative importance of the main attributes in minimising the twin problems of pre-contract time and cost overruns. In all cases, the statistical tests indicated $p < 0.001$. The analyses also however, highlighted the sub-attributes on which the two sectors differed in their judgement on their relative significance in contributing to pre-contract time and cost efficiency during the procurement of PPP projects.

# Chapter 7 Conclusions and Research Recommendations





# Chapter 7 Conclusions and Research Recommendations

## 7.1 Introduction

The basis for the research was to investigate the extent to which the pre-contract time and cost overruns were a major problem when procuring projects using the PPP/PFI approach. The focus was therefore to identify the key public sector client, consortium, the project, and the external environment attributes that contribute to pushing forward the process in more time and cost efficient manner. Earlier research having identified that negotiating the contracts has being the main cause of the delays and hence the excess bidding and pre-contract cost overruns, the theoretical foundation of the research was therefore based on literature on negotiation theory. This chapter therefore brings into focus the implications of the research findings for organisations undertaking to procure infrastructure projects the PPP/PFI delivery route.

Following a comprehensive review of literature, the research was driven by three main objectives and propositions. These objectives and propositions are restated here as follows:

*The Research Objectives*

i) To highlight the extent of pre-contract cost and time overruns when the PPP philosophy is used in procuring infrastructure services.

ii) To identify those characteristic attributes of the Private Sector Consortia and Public Sector Client Organisations, the Project, and the External Environment, that significantly contribute to the successful negotiation of PPP/PFI contracts in a timely and cost effective manner; and then develop a Generic Multi-Attribute Hierarchical Model capturing these respective attributes, the main components of which is illustrated in Figure 6.1.1.

iii) To explore the differences in perception between public and private sector on the relative importance of these attributes in contributing to the negotiation success.

*The Research Propositions*

a) The twin problems of pre-contract time and cost overruns are real in the PPP infrastructure procurement and therefore remain a serious issue to be addressed if the philosophy is to gain general acceptance among all stakeholders.

b) A generic model can be developed to capture in a hierarchical order of significance the key attributes that positively influence the efficient and effective implementation of the negotiations phase of the PPP procurement process in terms of minimising times and cost overruns to the parties.

c) Though there is a broad agreement between the key stakeholders (the public and private sectors), on the relative significance of the main attributes of the Consortium, the Public Sector Client, the Project, and the External Environment on the outcome of the PPP contract negotiations, differences do exist amongst them on the underlying dimensions to these main influence centres".

## 7.2 Pre-contract time and bidding cost outturns

The analysed data using descriptive statistics as reported in section 6.3 of Chapter 6, clearly confirmed the research proposition that the twin problems of pre-contract time and cost overruns are real in the PPP infrastructure procurement and therefore remain a serious issue to be addressed if the philosophy is to gain general acceptance among all stakeholders. The data revealed very high levels of time and cost overruns during the pre-contract stages of the PPP project procurement. Evidently, the educational/schools sector projects witnessed the highest overruns followed by the health sector projects. The least overruns were those of major civil engineering projects.

The findings of this study confirm the reported delays and excessive bidding cost as unearthed during the literature review. The findings of also collaborate the audit report by the National Audit Office on a number of PPP/PFI projects that the process towards securing the PPP/PFI contracts could be frustratingly long and costly (NAO, 1999a; NAO, 1999b). According to Owen and Merna (1999) these sorts of delays resulted in some high profile withdrawals by the private sector from the bidding process particularly during the early days of the PPP/PFI concept. Under such circumstances, competitions for PPP projects would fall – a situation that could

seriously erode the value for money objectives as contractors would begin to cash on it to make abnormal margins, and thus sparking public resentment towards the philosophy.

An interesting feature of the findings is that the major civil engineering projects procured through the PPP route by way of Design Build Finance and Operate (DBFO), have had their pre-contract cost and time overruns better contained. The analyzed data showed a much smaller variation in the cost and time outturns for the civil engineering projects. Generally, major civil engineering projects are centrally procured through such institutions as the Highway Agency for the major road projects. These centralized institutions tend to be frequent and major buyers of construction services. This may thus explain the underlying principle in the negotiation literature that the outcome of any bargaining process is significantly influenced by such elements as the degree of mutual dependence and the distribution of power between the parties; previous experience and interaction; the organizational culture and strategy; and the extend of conflict of interest and perceptual distortions both within the individual organizations and that between the bargaining parties (McCall and Warrington, 1989).

## 7.3 The Generic Model

The research identified the role of the public sector client as the key in promoting efficiency during the procurement of projects using the PPP project delivery strategy. No doubt the public sector attributes came topmost in influencing the process towards efficiency in negotiating the PPP/PFI contracts. This was followed by those of the private sector consortium, the project, and those of the external environment. These key significant attributes are discussed in depth in order to highlight their implications for improving the process towards the efficient procurement of projects using the PPP route.

### 7.3.1 Public Sector Attributes

The study has clearly identified the role of the public sector procurer as key in making the process towards efficiency in the procurement of projects feasible. Of major importance in terms of *technical capabilities* of the public sector client organisation,

is the ability to establish project parameters and prepare output specifications. Writing a comprehensive output specification of the services required for the project, rather than describing the asset, is one of the biggest differences between PPP project procurement and the traditional public sector capital asset procurement. It is clear that sound project specification and scoping are the bedrock of successful negotiations. Project parameters which may be susceptible to frequent changes and scope-creep will frustrate the progress of any negotiations as the negotiators may be in a dilemma as to the sort of provisions to make for such changes in the contract which would satisfy both parties. Ambiguous output specifications would mislead bidders into putting forward high initial offers - a factor which has been identified in the negotiating literature as the cause of high conflict-of-interest situation, which acts as a major impediment to effective and efficient negotiation with the negotiations tending to become deadlocked.

In-house expertise within the public sector client organisations is vital to the process. No doubt this has featured as one of the strongest attributes necessary to move the PPP project procurement process forward. It is crucial for the public sector client organisation to have a strong team of experts in order to be able to set out the output specifications properly in the first instance and then be able to clearly appreciate the innovations introduced by the bidders in their proposals. Where this is lacking, it is strongly recommended that the current team is supported by expert consultants from industry. Failure by the public sector client to match the technical and negotiating capabilities of the team from the Consortium in order to unravel such intricate issues as performance measures for the unitary payments, redundancy of existing labour and related issues, third party revenue generation, obsolescence, and the role of the existing public sector management during the concession period, would only lead to protracted negotiations. It may also lead to *counterfactual thinking* where the parties, after concluding the deal, begin to start thinking they could have obtained a better deal. The result is that this could lead to the reopening of negotiations no sooner than the deal have been concluded, as was reported by the World Bank on a number concession contracts that they monitored (Bell, 2003). If both parties have quite different perspectives on the project then there will clearly be problems.

Adequate preparatory work as a key technical attribute relates to effective and sound pre-feasibility studies which should enable the public sector team establish a robust Outline Business Case, and an all-encompassing Public Sector Comparator before going to tender. Such high quality level of preparatory work should also enable the public sector client to clearly identify risks and be able to allocate them optimally between the parties. The identification by this research of the ability of the public sector to undertake a sound preparatory works reinforces Owen's (2003) findings with respect to the Dartford Crossing, M6 Toll road, and the Croydon Tramlink projects where the early project feasibility by the public sector client organisations, the Highway Agency, enabled them to identify a number of local concerns and fully investigated them before putting the projects forward. It also enabled them to identify the project requirements early and reflected them in the output specifications. These helped to eliminate doubts and uncertainties and other risks that the bidders might perceive. It then led bidders to put forward relevant proposals and thus helped in eliminating unnecessary delays during the negotiation stages. It could be concluded that these early effective preparatory works accounted for what has been revealed by this current research that the pre-contract time and cost overruns were better contained within the major civil engineering projects procured using the PPP/PFI concept.

The ability to organise effectively is always and important element in any project undertaking. Within *organisational capabilities* of the public sector institutions, the model identified commitment and the collaboration within the public sector team as the most influential attributes, perhaps reflecting concerns that large, multi-faceted clients can pose problems and frustrate progress. The level of bureaucracy in the decision making process is also rated highly. However the trend, in the UK at least, appears to be increasing levels of regulation and standardisation in contractual clauses and conditions, as the original 'deals not rules' concept did not work. A distinction has to be made, though, between best practice guidance and restrictive regulation. The *ability to accept and absorb risk* may have been expected to be rated higher given the major differences between public and private sector views on risk in early stages when private sector was expected to accept more or less all project risks. It seems more realistic attitudes prevail now. Perhaps rated surprisingly lowly, is the significance of being able to use experience and expertise of others in guiding the

procurement process. It seems not much premium is placed on the use of knowledge or the experiences of others.

The PPP philosophy clearly placed emphasis on the private sector providing the necessary funding for the projects with little or nor financial support coming from the public sector for the directly into the project. It is there not surprising that the attributes relating to the *financial capabilities* of the public sector procurer attracted relatively lower rating. The sub-attribute relating to the ability of the public sector organisation to raise funds received particularly low ratings. Clearly very limited numbers of issues are therefore likely to arise during the negotiations relating to the public sector organisation's ability to provide financial support for the project. This is understandable because the main financial burden lies with the Consortium. However, where shadow tolls/tariffs are involved, the public sector's ability to pay becomes paramount. The sub-attributes, "ability to pay, and strong financial support/guarantees from central government", therefore received relatively higher ratings. The public sector client therefore needs to demonstrate beyond all reasonable doubt that it has the capacity to pay in order to boost the confidence of the Consortium in the viability of the project.

### 7.3.2 Consortium Attributes

The PPP/PFI concept involves the Consortium designing the project in order to deliver the services as specified in the client's output specifications. This would require of the Consortium to be able to fully appreciate the needs of the public sector procurer. Any misconception at the bidding stage would naturally prolong the negotiations. Added to the technical issues, is what has been emphasised in the negotiation literature as an early demonstration of altruistic/cooperative behaviour towards the opposing negotiating party during the negotiations through an attempt to maximise joint outcomes. Since the relationship between the parties within a PPP project are long term, an early indication of openness in the communication would signal the development of trust and thus induce a similar response from the public sector negotiation team and hence ease the process towards enhancing the partnership relationship for the effective delivery of the services. Frank and open communication should eliminate the dangers of high levels of conflict of interest, thus avoiding the tendency of creating deadlocks during the negotiations. No doubt, the group of attributes relating to the nature and strength of the Consortium comes top among the

hierarchy of attributes that influence the efficient negotiation of the tenders. These attributes include hard organisational and soft people issues such as appointing a dedicated bid manager, understanding the public sector needs, open and frank communication between the participants, and involving at an early other stake holders in the process.

The setting up a consortium to participate in the bidding for a PPP/PFI projects involves bringing together a host of experts needed for the design and implementation of the project. This team of experts would include not only technocrats but also financiers, bankers, investment analysts, lawyers and in some instances sociologists and educationists. The research has rightly identified the importance of the role of a dedicated Bid Manager who could co-ordinate these individuals. These individuals, because of the nature of their training, may naturally tend to exhibit some elements of differentiation. The early involvement of the stakeholders has also received a higher weighting as ideas have to be galvanised quickly in order to not only to win the bid, but also for the efficient and profitable management of the resulting contract. The nature of the PPP contracts is such that the winning Consortium may have to live with any initial mistakes for the whole of the concession period; hence the pooling of ideas at the early stages is very essential.

The early stakeholder involvement concept is currently being pursued by the Highway Agency in what they term as 'Early Contractor Involvement (ECI)'. According to their Chief Executive, Mr John McDonong, the ECI concept in their highway projects was better, in the sense that a contractor is selected through a preliminary screening process and then invited to participate in the design and costing of the project so that the bidding cost of the contractor is paid for through the process (Contract Journal, 2003). This process should help eliminate the initial costs incurred by the public sector organisation in situations where the feasibility and outline designs are to be initially carried out by independent consultants for public sector before going to tender.

Readiness by the Consortium to accept risks has also been identified as a key attribute in pushing forward the negotiation process. Though the concept of the PPP is to maximise transfer of risks to the private sector, it would be naïve to assume that they

would be prepared to take on all risks associated with the project. Hence the ineffectual identification and allocation of risks could bog down the negotiation process unnecessarily. The risk allocation among the parties should be optimal such that each party is allocated risks that they are best able to manage. The European Investment Bank, acknowledging that procuring projects through the PPP concept is a more expensive mode of delivery than the traditional one, recommended that the anticipated gain to the public sector client should be efficient management associated with the transfer of risks (Gaffney et al. 1999) As noted by Owen in his research into privately financed toll roads, the inappropriate allocation of risks during the Second Severn Crossing contributed to delays during the negotiations. He further found that placing the risks associated with public enquiries for the M6 Toll road within the domain of the private sector consortium resulted in one of the longest public enquiries (Owen, 2003).

Clear and robust designs are often seen to be of key importance, as both public and private sector parties are likely to be more comfortable with proven and well-understood solutions. This is why the group of attributes relating to the quality of technical proposals produced for the bid comes second in order of significance. It is ironic that a key objective of PPP - encouraging innovation in design solutions, is rated so lowly as a success factor in the negotiations. Perhaps this is not surprising as innovation and technical complexity create conditions of uncertainty in meeting project objectives.

### 7.3.3 Project Attributes

The study revealed that overall, attributes relating to the project's marketability and characteristic features of the project itself i.e. largely technical and relating to the delivery of the asset, almost play equal significant role in the negotiation process. With regard to the project nature attributes, the most significant attribute relates to the size and complexity of the facility. Arguably the larger and more complex the project, the more items and aspects there are for negotiation and agreement between the parties, and there is also a less complete understanding or conception of the whole project. With increasing complexity, there is more scope for misunderstanding what is required and different perceptions may be held as to the requirements of the project.

The level to which the project risks lend themselves easily identification, assessment and allocation, is also accorded a high priority by the respondents. This is hardly surprising given that the burden of risk allocation has been such a contentious issue from the outset. Flexibility in the ability to respond to future changes is also important. This is understandable, since both parties are contractually committing themselves to service delivery for a very long time.

Considering the project's marketability, high priority attributes naturally include its ability to attract funding. With such huge long term investment required, lenders are key participants in the project procurement from the outset. Indeed the Treasury's PPP procurement framework frequently underlines the need for lenders to be comfortable with the risk allocation throughout the process. Other important attributes include the level to which the project meets the needs of the public, and the level of tariffs and tolls required for the project to be viable to the private sector to participate in. A project meeting the general public need would not only involve the service rendered to the public through the facility, but increasingly projects are being assessed by their contribution to enhancing the environment. Protecting the environment is essential the survival of the human race, hence any PPP project that impacts negatively on the environment will risk resistance and protestation from the public.

### 7.3.4 External Environment Attributes

The group of attributes relating to the socio-economic environment followed by the political and legal/regulatory environments are regarded as most significant. Within the socio-economic environment sub-group, a mature financial market is a big asset in advancing the PPP process, as huge capital outlays are required. These large capital outlays must be supported by the financial institutions with the capability to effectively assess the viability of the projects before investing in them. A mature financial market also enables the Consortium to float shares for the Special Purpose Vehicle set up specifically for the project and to also refinance their equity investments in the projects once the construction risks have been eliminated as the project enters the operation phase. It is therefore not surprising that the maturity of the financial markets as an attribute came top among the list of the socio-economic attributes. This is then followed by the demonstration of strong public/private sector relationships. Successful negotiations are built around trust. The public sector

therefore needs to understand what the driving motivations of private sector business are. In the same vein the private sector also needs to understand the role of the public sector client as the custodian and protector of public investments for which they must be held accountable. They also need to understand the institutional environment within which the public sector works which reflects itself in the form of norms and informal 'rules of the game' such as values and traditions within the public sector. This way, a much more harmonious relationship can be established that can foster altruistic behaviour among the parties during the negotiations.

Within the political and legal/regulatory environment sub-group, clearly defined general planning and regulatory frameworks features strongly as the top ranking attribute in moving forward the process efficiently. This is followed by carefully established institutional and policy frameworks at the organisational level for the implementation of PPP projects. Well established and tested guidelines will no doubt allay the fears of both the Consortium and other investors such as the funding institutions on the project especially on the legal implications of issues related to the project. Whilst clear policy frameworks are important, these are not to be in the form of excessive regulation as this may tend to stifle innovation. The scope for discretional interpretation and implementation of these regulations must be as limited as possible to avoid abuse. The regulations may need to be supported with powerful legal instruments matched by transparency in governance.

The stability of the political system and an all-party support for the philosophy come next in order of significance. A stable political system naturally reduces the level of political risks associated with such long term contracts as envisaged in the PPP philosophy. This should in turn reduce the level of tariffs or tools that may be proposed by the private sector bidders. There has certainly been considerable discussion about the politics and ideology behind PPP at a national level. Participants are naturally nervous about the long term viability of something that attracts so much heated debate and discussion, and may be subject to radical change by future governments with different views. The success or failure of PPP in terms of value for money for the public has to be convincingly made by both sides of the political divide in order to gain public acceptability as public protests against the philosophy could send the wrong signals to the private sector companies that may be contemplating to

participate in it. After all, the higher the level of participation, the more likely would higher value for money be obtained through innovative designs and financial proposals. It is a generally accepted fact that competition is better than monopoly as it allows efficient allocation of resources and would allow the efficient management of the commercial risks by the consortia managing these infrastructure projects. The net benefit of this would be better quality of services and lower tariffs and tolls to the benefit of society at large - a condition that may help enhance public acceptability of the philosophy. This would help minimise the risk of moves to limit the returns to the private sector as the idea of profiting from investment in public sector assets can be politically sensitive.

## 7.4 Contributions to Knowledge

The PPP project procurement has for long been criticised for the twin problems of pre-contract time and bidding cost overruns. This study has investigated in a more empirical manner the extent of the problem and clearly identified sectors where the problem is more pronounced. The study also identified a hierarchy of attributes that contribute to a more efficient way of procuring projects using the PPP strategy especially during the negotiation stages. The generic multi-attribute hierarchical model developed during the research also received very high approval rating from industry experts in terms of its comprehensiveness in the coverage of the attributes, its practical relevance in identifying competency gaps within organisations undertaking PPP projects, and its robustness as a guide to decision making when procuring PPP projects. In fact, one of the experts, as part of his comments on the model, indicated that he would apply it on his next PPP projects.

### 7.4.1 To industry

The in-depth review of the literature on bargaining/negotiation theory within the behavioural sciences is a leap forward in harnessing knowledge for application within the construction industry. The skills and disciplines of bargaining and negotiations have over the past decades been absent within the construction industry due to the introduction in the 1960s of the *routinized* form of project procurement via the traditional approach where the client specifies virtually everything with the winning

bid determined purely on the basis of the lowest offered price through open competitive bidding without room for any form of negotiations.

The findings of the research in respect of the overall pre-contract time and cost overruns confirms process of the PPP procurement toward securing meaningful contract is still fraught with delays and cost overruns. The process is equally expensive and therefore adequate budgetary preparations need to be undertaken in order to avoid abandoning the project midstream. There is also the need to develop the relevant competencies within the public sector organisations in-house to help progress the process smoothly and efficiently. These competencies could then be effectively transferred to the next stages of the procurement process – the construction and maintenance phases of the facility.

One of the major criticisms levelled against projects procured through the PPP/PFI scheme was the inability of the public sector organisations to identify and allocate risks optimally. Research has revealed that for some projects within the NHS the value of risk transfer constituted in some cases up to 50% of the total capital cost to the private sector – an indication of a high level of compensation being paid to the private sector for risk transfer. As a result some consortia have refinanced their loans at a lower cost because the risks turned out to be lower than expected, bringing to them windfall profits (Pollock, et al., 2002; The PFI Report, 2001). In some instances the inability to allocate the risks appropriated resulted in the projects running into major difficulties during the implementation stages such as the Benefits Agency and Passport Office IT projects, and the Modbury Hospital in South Australia (Pollock, et al, 2002).

The hierarchy of attributes captured in the generic model should act as an essential guide for the development and enhancement of the relevant competencies within the public and private sectors. This is vital for a more constructive negotiation process during the PPP procurement in order to achieve win-win situations. In the same vein those attributes identified for the private sector should be focused on by the public sector procurers in setting out there requirements for the prospective bidders for their project in the form of more appropriate and relevant pre-qualification criteria. It is therefore pleasing to note that as part of the feedbacks on the model by the industry

experts, one of them indicated he would apply the model in his future PPP/PFI projects.

As the UK concept of the PPP philosophy is gaining international popularity and countries all over the world are trying to adopt it as an alternative route to developing and maintaining their public infrastructure, it is firmly believed that this model could be replicated in those countries with minor modifications to reflect national cultures and institutional rules and regulations.

### 7.4.2 To Academia

The ever-increasing use of alternative procurement strategies such as the PPP, calls for the training and development of relevant skills in contract negotiations. The hierarchy of attributes captured in the model developed during this research could act as springboard for the structuring of rich syllabus content for contract negotiations and as a tool kit for educational purposes.

## 7.5 Areas for Further Research

During the investigations, a number of areas emerged, the further study of which will go to enhance the search for relevant knowledge needed to improve infrastructure procurement using the PPP philosophy. These identified areas have therefore been highlighted upon below.

### 7.5.1 Time and cost efficiency model

When larger amounts of data becomes available as more PPP/PFI project are negotiated, it would be appropriate to develop a multiple regression analysis that can model the relations between these derived attributes to the pre-contract procurement cost and time outturns. The study should also lead to the developments *efficiency indices* that combine pre-contract time and cost out-turns. These indices could act as a guide to organisations who are procuring PPP projects for the first time and even for the experienced ones to improve on the process. They could also be used as a basis for judging how a particular organisation has performed in the procurement of its PPP project.

### 7.5.2 Sector-by-Sector Comparative Study

The need to investigate why civil engineering projects procured through the PPP strategy appear to have been accomplished in a more time and cost efficient fashion at the pre-contract stages. This should cover areas such as whether PPP projects procured through a central body are done much more efficiently than through decentralised institutions and where there are any differences, what lessons can be learnt, what elements within these two types of governance could be used to predict the variances in the pre-contract time and cost out-turns between institutions.

### 7.5.3 The extent of re-negotiations after contract execution

The need to investigate the extent to which PPP contracts are renegotiated during the life of the projects and the sort of impact they have on the efficiency in the level of services provided through the projects, and whether the conduct of the initial pre-contact negotiations has a bearing on the level of these renegotiations.

### 7.5.4 Model Bidding and Contract Documents

Developing a model bidding and contract document that carefully captures these attributes in order to enhance the PPP procurement process will be beneficial to the promotion of the PPP philosophy.

## 7.6 Limitations of the Research

### 7.6.1 Data size

Although substantial data has been gathered towards the development of this study, it is hoped that the findings of the requirements of the first objective of this research – the extent of pre-contract time and cost overruns, could be enhanced if data could be obtained on a greater number of projects. Currently, the PPP philosophy is at its infancy and as more and more projects are procured through this delivery system, large volumes of data of this nature should be readily available for analysis and for an informed judgement of how the system is performing.

### 7.6.2 The Cultural dimension

This research has been conducted purely on the UK practice of the PPP philosophy. There is no doubting the fact that negotiation represents a microcosm of our broader social milieu and that negotiating behaviour is therefore regulated by societal norms. Cultures differ a great deal especially across countries and so the model may be limited by the fact that cultures within other countries may have some element of influence on the hierarchy of the attributes. This research recognises this as a limitation for its universal application without recourse to considerations for the local environment to which it may be applied. In cultures where collectivism is valued highly, the negotiating behaviour tends to be high *other-oriented* during the bargaining. In such cultures much more emphasise may be placed on trust and higher degree of altruistic and cooperative negotiating behaviour towards the other party. Further research may therefore be needed on an international basis as a means for a global validation of the model.

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# APPENDICES

# Appendix A

Appendix A.1: The Questionnaires for data collection

Appendix A.2: Summary Research Report and Feedback Questionnaire on the Generic Model

HERIOT WATT UNIVERSITY

8 May, 2002

Dear Sir or Madam:

**Public Private Partnerships/Private Finance in Infrastructure Procurement: A research project to analyse the factors that influence the procurement time and cost out-turns.**

The above research is looking at the key attributes of the consortium, the public sector, the project and the external environment.

The research aims at:

1. Examining the extent to which these attributes influence the ability of the parties to conclude the PPP/Private Finance procurement process from the OJEC Notice/Advert to the date of signing the contract agreements in a timely and cost effective manner.
2. Developing a model that can link these attributes to the procurement time and cost out-turns.

It shall be most appreciated if you could spare approximately 10 minutes to share your valuable knowledge and experience by completing the attached questionnaire.

Please be assured that any information given will be treated in the strictest confidence. The preliminary survey report should be ready by June and we shall be delighted to send you a copy. If you desire to have one please indicate your email address in Part 1 of the questionnaire.

A prepaid envelope has been provided for the return of the questionnaire and we would very much appreciate it if it could be returned at your earliest convenience.

Yours sincerely

Marcus Ahadzi
(PhD Research Student)

Dr Graeme Bowles
(Research Project Supervisor)

**School of the Built Environment**
Sir Edwin Chadwick Building Heriot-Watt University Edinburgh EH14 4AS United Kingdom
Telephone +44 (0)131 449 5111 Fax +44 (0)131 451 3161
www.sbe.hw.ac.uk



***Edinburgh Campus*** • *Scottish Borders Campus*

**Survey on Public Private Partnerships (PPP)/Private Finance in infrastructure procurement**
(May 2002)

The main objective of this survey is to examine the extend to which the key attributes of the **consortium, the public sector, the project and the external environment** influence the time and cost out-turns of the PPP procurement process from the OJEC Notice/Advert to the eventual signing of the contracts. The survey forms an essential part of a PhD research project.

Please be assured that information given will be treated in the strictest confidence and will be used for academic purposes only and that only a summary of the results may be disclosed. The questionnaire has been designed to take approximately 10 minutes to complete.

**Part I: General Information**

**1. On behalf of which sector have you been involved in PPP project procurement?** (please tick)

Public Sector Organisation ☐ Private Sector Consortium ☐

**2. Designation:** (please tick)

i) Chief Executive/Managing Director ☐ ii) Project Manager ☐ iii) Legal Adviser ☐
iv) Financial Adviser ☐ v) Property Adviser ☐ vi) Facilities Manager ☐
vii) Cost Adviser ☐ viii) Architect ☐ ix) Engineer ☐
x) Others (please state)

**3. Your personal experience in PPP/Private Finance procurement in terms of number of tenders you participated in:** (please tick)

No of tenders: 1-2 ☐ 3-4 ☐ 5-6 ☐ 7-8 ☐ 9-10 ☐ over 10 tenders ☐

**4. Type of project:** (please tick the one in which your have been mainly involved and for which your answers to this questionnaire apply)

i) Health ☐
ii) Schools ☐
iii) Prisons ☐
iv) Transportation projects e.g. roads, bridges, rails ☐
v) Water and Sanitation ☐
vi) Housing ☐
vii) Others (please state)

**5. Project name:**

**6. Estimated capital value of project (in £m):**

**7. What was the indicative procurement time schedule from the date of the OJEC Notice/Advert to the time the contract was expected to be signed?** (please state)

..... months

**8. What was the eventual time taken to conclude the deal?** (please state)

.....(months)

**9. What was the initial estimated direct cost to the organisation you represented in carrying out the tendering and negotiation processes?** (please state)

.....(£m)

**10. What was the final direct cost to the organisation you represented in carrying out the tendering and negotiation processes?** (please state)

.....(£m)

**11. Name and Address for correspondence (optional):**

name: e-mail: tel:

The preliminary survey report is expected to be ready by the end of June 2002 and we will be delighted to send you a copy via your above e-mail address if you desire to have one by indicating a tick in this box. ☐

**Part II: Significance of Consortium Attributes**
The significance of the consortium attributes refers to the extent to which these attributes influence the ability of the parties to successfully conclude the PPP/Private Finance procurement process from the OJEC Notice/Advert to the eventual signing of the contracts in a timely and cost effective manner.

Please tick the appropriate scale as follows:

**Scale:** insignificant = 1, slightly significant = 2, significant = 3, very significant =4, extremely significant =5

| ID No: | Consortium Attributes | Level of significance 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **CS** | **Nature and Strength** | | | | | |
| cs1 | Previous experience in PPP procurement. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cs2 | Reputation enjoyed by the consortium. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cs3 | PPP procurement philosophy being part of the consortium's strategic business interest. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cs4 | Ability of the consortium to tie equity into the project for a long period. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cs5 | Readiness to accept risk. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cs6 | Open/frank communication during the negotiations. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cs7 | Willingness to commit to earlier negotiated terms. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cs8 | Current job holding of consortium members. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cs9 | Appointing a dedicated bid manager. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cs10 | Ability to understand what the public sector wants. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cs11 | Ability of consortium members to work harmoniously with each other. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cs12 | Experience of previously working together as a team. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cs13 | Taking proactive role in initiating the project. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cs14 | Ability to obtain planning permission timeously. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cs15 | Early involvement of other stakeholders such as funding organisations, facilities managers, specialist suppliers, subcontractors and other experts in the process. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cs16 | Personal attributes of the champion within the consortium. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cs17 | Ability to persevere even if the negotiations become protracted. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cs18 | The multidisciplinary nature of consortium team. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Cs19 | Experience of previously working with the public sector procurer. | ☐ | ☐ | ☐ | ☐ | ☐ |
| **CT** | **Quality of the Technical Proposal** | | | | | |
| ct1 | Robustness of outline technical proposal. | ☐ | ☐ | ☐ | ☐ | ☐ |
| ct2 | Clarity of submissions and responses to queries. | ☐ | ☐ | ☐ | ☐ | ☐ |
| ct3 | Innovative technical solutions. | ☐ | ☐ | ☐ | ☐ | ☐ |
| ct4 | Provision of sound technical guarantee. | ☐ | ☐ | ☐ | ☐ | ☐ |
| **CF** | **Quality of the Financial Proposal** | | | | | |
| cf1 | Level of financial guarantees provided/proposed by the consortium. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cf2 | Payment mechanisms proposed | ☐ | ☐ | ☐ | ☐ | ☐ |
| cf3 | Level of government funding/guarantees required by the consortium. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cf4 | Attractiveness of financial proposals in terms of levels of tariff/tolls proposed | ☐ | ☐ | ☐ | ☐ | ☐ |
| cf5 | Credibility of financiers | ☐ | ☐ | ☐ | ☐ | ☐ |
| cf6 | Level of exposure of the public sector organisation to financial risks contained in the financial proposals. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cf7 | Level of financial returns to the public sector organisation. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cf8 | Length of concession period proposed. | ☐ | ☐ | ☐ | ☐ | ☐ |
| cf9 | Financial proposal demonstrating the capacity of project to generate third party revenue. | ☐ | ☐ | ☐ | ☐ | ☐ |

| | | | | | | |
|---|---|---|---|---|---|---|
| cf10 | High Equity/debt ratio so as to drive commitment. | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Other consortium attributes that significantly influence the ability of the parties to conclude deals in a timely and cost effective fashion (please list and rate) | ☐ | ☐ | ☐ | ☐ | ☐ |
| | | ☐ | ☐ | ☐ | ☐ | ☐ |
| | | ☐ | ☐ | ☐ | ☐ | ☐ |

**Part III: Significance of Public Sector Attributes**

The significance of the public sector attributes refers to the extent to which these attributes influence the ability of the parties to successfully conclude the PPP/Private Finance procurement process from the OJEC Notice/Advert to the eventual signing of the contracts in a timely and cost effective manner.

Please tick the appropriate scale as follows:

**Scale:** insignificant = 1, slightly significant = 2, significant = 3, very significant =4, extremely significant =5

| ID No | Public Sector Attributes | Level of significance | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| **PO** | **Organisational** | | | | | |
| po1 | Ability to effectively sensitise public opinion on the project. | ☐ | ☐ | ☐ | ☐ | ☐ |
| po2 | Level of reputation enjoyed by the organisation. | ☐ | ☐ | ☐ | ☐ | ☐ |
| po3 | Level of bureaucracy in the decision making process. | ☐ | ☐ | ☐ | ☐ | ☐ |
| po4 | Attitude to cost e.g. excessive desire to drive down cost | ☐ | ☐ | ☐ | ☐ | ☐ |
| po5 | Top level commitment within the public sector organisation | ☐ | ☐ | ☐ | ☐ | ☐ |
| po6 | Level of collaboration and commitment among the public sector team. | ☐ | ☐ | ☐ | ☐ | ☐ |
| po7 | Open/frank and flexible communication during negotiations. | ☐ | ☐ | ☐ | ☐ | ☐ |
| po8 | Existence of an established PPP/Private Finance Unit to foresee the procurement process. | ☐ | ☐ | ☐ | ☐ | ☐ |
| po9 | Ability to assist in land acquisition and in obtaining planning permission | ☐ | ☐ | ☐ | ☐ | ☐ |
| po10 | Ability to tap knowledge and expertise gained by other public sector organisations in PPP/Private Finance procurement. | ☐ | ☐ | ☐ | ☐ | ☐ |
| po11 | Level of commitment of the organisation to earlier negotiated terms. | ☐ | ☐ | ☐ | ☐ | ☐ |
| po12 | Ability to accept and absorb risks. | ☐ | ☐ | ☐ | ☐ | ☐ |
| **PT** | **Technical** | | | | | |
| pt1 | Strong in-house expertise in infrastructure procurement that is able to understand the private sector's technical, financial and innovative approaches. | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Levels of preparatory work e.g. market sounding and effective pre-qualification of bidders. | ☐ | ☐ | ☐ | ☐ | ☐ |
| pt2 | Previous experience in PPP/Private Finance infrastructure procurement. | ☐ | ☐ | ☐ | ☐ | ☐ |
| pt3 | Previous experience in infrastructure procurement generally. | ☐ | ☐ | ☐ | ☐ | ☐ |
| pt4 | Ability to establish clears statements of the evaluation criteria in the bidding documents. | ☐ | ☐ | ☐ | ☐ | ☐ |
| pt5 | Ability to effectively establish the project parameters in the form of output specifications. | ☐ | ☐ | ☐ | ☐ | ☐ |
| pt6 | Making use of standard bidding documents. | ☐ | ☐ | ☐ | ☐ | ☐ |
| **PF** | **Financial** | | | | | |
| pf1 | Ability to raise funds through Bonds. | ☐ | ☐ | ☐ | ☐ | ☐ |
| pf2 | Ability to receive financial support/guarantees from the central government. | ☐ | ☐ | ☐ | ☐ | ☐ |

| | | |
|---|---|---|
| pf3 | Ability to offer tax concessions and/or flexible tax regimes. | ☐ ☐ ☐ ☐ ☐ |
| pf4 | Ability to provide equity finance. | ☐ ☐ ☐ ☐ ☐ |
| pf5 | Capability to pay the shadow tolls/tariff levels proposed by the private sector. | ☐ ☐ ☐ ☐ ☐ |
| | Other public sector attributes that significantly influence the ability of the parties to conclude deals in a timely and cost effective fashion. (please list and rate) | |
| | | ☐ ☐ ☐ ☐ ☐ |
| | | ☐ ☐ ☐ ☐ ☐ |

**Part IV: Significance of Project Attributes**

The significance of project attributes refers to the extent to which these attributes influence the ability of the parties to successfully conclude the PPP/Private Finance procurement process from the OJEC Notice/Advert to the eventual signing of the contracts in a timely and cost effective manner.

Please tick the appropriate scale as follows:

**Scale:** Insignificant = 1, slightly significant = 2, Significant = 3, Very significant = 4, Extremely significant = 5

| ID No | Project Attributes | Level of significance 1 2 3 4 5 |
|---|---|---|
| **PN** | **Nature of Project** | |
| pn1 | Size and complexity. | ☐ ☐ ☐ ☐ ☐ |
| pn2 | Amenability to innovation. | ☐ ☐ ☐ ☐ ☐ |
| pn3 | Ease with which to identify, assess and allocate the project risks. | ☐ ☐ ☐ ☐ ☐ |
| pn4 | Impact of project on the environment. | ☐ ☐ ☐ ☐ ☐ |
| pn5 | Need for a third party to improve existing infrastructure. | ☐ ☐ ☐ ☐ ☐ |
| pn6 | Health and safety provoked by the project's development. | ☐ ☐ ☐ ☐ ☐ |
| pn7 | Level of design completion required at tender. | ☐ ☐ ☐ ☐ ☐ |
| pn8 | Ability of project to respond to future changes. | ☐ ☐ ☐ ☐ ☐ |
| pn9 | Project location and site conditions. | ☐ ☐ ☐ ☐ ☐ |
| pn10 | Uniqueness of project. | ☐ ☐ ☐ ☐ ☐ |
| pn11 | Tendency of project rendering existing public sector staff redundant. | ☐ ☐ ☐ ☐ ☐ |
| **PM** | **Marketability of Project** | |
| pm1 | Suitability for private participation. | ☐ ☐ ☐ ☐ ☐ |
| pm2 | Level to which project must meet general public needs. | ☐ ☐ ☐ ☐ ☐ |
| pm3 | Possible land and property deals and buyouts. | ☐ ☐ ☐ ☐ ☐ |
| pm4 | Useful life at the end of concession period. | ☐ ☐ ☐ ☐ ☐ |
| pm5 | Bankability of project i.e. ability of project to attract funding from financial institutions. | ☐ ☐ ☐ ☐ ☐ |
| pm6 | Potential to achieve near monopolistic advantage for the services delivered. | ☐ ☐ ☐ ☐ ☐ |
| pm7 | Ability of project to generate third party revenue. | ☐ ☐ ☐ ☐ ☐ |
| pm8 | Prospect of project offering opportunities for future refinancing. | ☐ ☐ ☐ ☐ ☐ |
| pm9 | Ability of project to attract property development rights e.g. estates, hotels, supermarkets, offices, etc. | ☐ ☐ ☐ ☐ ☐ |
| pm10 | Level of tariffs and tolls. | ☐ ☐ ☐ ☐ ☐ |
| | Other project attributes that severely impact on the ability of the parties to conclude deals in a timely and cost effective fashion. (please list and rate) | |
| | | ☐ ☐ ☐ ☐ ☐ |
| | | ☐ ☐ ☐ ☐ ☐ |

**Part V: Significance of the External Environment Attributes**
The significance of the external environment attributes refers to the extent to which these attributes influence the ability of the parties to successfully conclude the PPP/Private Finance procurement process from the OJEC Notice/Advert to the eventual signing of the contracts in a timely and cost effective manner.

Please tick the appropriate scale as follows:

**Scale:** insignificant = 1, slightly significant = 2, significant = 3, very significant =4, extremely significant =5

| ID No | External Environment Attributes | Level of significance 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **ES** | **Socio-Economic** | | | | | |
| es1 | Availability of traditional projects. | ☐ | ☐ | ☐ | ☐ | ☐ |
| es2 | Maturity of the financial markets. | ☐ | ☐ | ☐ | ☐ | ☐ |
| es3 | Perceived future economic uncertainties e.g. inflation, interest rate and exchange rate volatility. | ☐ | ☐ | ☐ | ☐ | ☐ |
| es4 | Long term prospect for sale and purchase of equity in PPP/Private Finance projects. | ☐ | ☐ | ☐ | ☐ | ☐ |
| es5 | Strong public/private sector relationships. | ☐ | ☐ | ☐ | ☐ | ☐ |
| **EP** | **Political** | | | | | |
| ep1 | Public acceptability of the PPP/Private Finance philosophy. | ☐ | ☐ | ☐ | ☐ | ☐ |
| ep2 | Stability of the political system. | ☐ | ☐ | ☐ | ☐ | ☐ |
| ep3 | Level of all-party political support for the philosophy. | ☐ | ☐ | ☐ | ☐ | ☐ |
| **EL** | **Legal/Regulatory regime** | | | | | |
| el1 | Clearly defined planning and regulatory frameworks. | ☐ | ☐ | ☐ | ☐ | ☐ |
| el2 | Ability of foreign investors to repatriate earnings. | ☐ | ☐ | ☐ | ☐ | ☐ |
| el3 | Clearly defined rules and regulations for the foreign ownership of property. | ☐ | ☐ | ☐ | ☐ | ☐ |
| el4 | Clearly defined legislation on intellectual property rights. | ☐ | ☐ | ☐ | ☐ | ☐ |
| el5 | Clearly established institutional and policy frameworks by the Central Government on PPP/Private Finance. | ☐ | ☐ | ☐ | ☐ | ☐ |
| | Other external environment attributes that significantly influence the ability of the parties to conclude deals in a timely and cost effective fashion (please list and rate) | | | | | |
| | | ☐ | ☐ | ☐ | ☐ | ☐ |
| | | ☐ | ☐ | ☐ | ☐ | ☐ |

**Part VI Overall Assessment**
Finally, on a 1 to 4 scale, 1 being the least, please indicate the level to which each of these elements influence the ability of the parties to successfully conclude the PPP/Private Finance procurement process from the OJEC Notice/Advert to the eventual signing of the contracts in a timely and cost effective manner

| Element | Scale |
|---|---|
| The Project Attributes | |
| The Consortium Attribute | |
| The Public Sector Attribute | |
| The External Environment Attributes | |

Thank you.

PAGE/PAGES
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INSTRUCTION
FROM
UNIVERSITY

*Appendix A.2*

HERIOT WATT UNIVERSITY

……/03/04

Dear Sir or Madam:

## Research report on Public Private Partnerships

As we did promise when we sent out the questionnaire for the above research, please find attached a summary of the findings. May we take this opportunity to express our appreciation of your contribution towards the realisation of this project.

Once again we would like to take a bit of your time to provide us with a feedback on the model that has been generated from the analysis. Kindly complete the attached one page feedback format and mail it back via the prepaid envelop.

The focus of the research was to investigate the extent of pre-contract time and pre-contract/bidding cost overruns for projects procured using the PPP/PFI strategy, and to develop a hierarchy of attributes that could be used as a guide to improve the process. Thanks

Yours sincerely

Marcus Ahadzi

**School of the Built Environment**
Sir Edwin Chadwick Building Heriot-Watt University Edinburgh EH14 4AS United Kingdom
Telephone +44 (0)131 449 5111 Fax +44 (0)131 451 3161
www.sbe.hw.ac.uk

***Edinburgh Campus*** • *Scottish Borders Campus*

# Research report on PPP/PFI project procurement

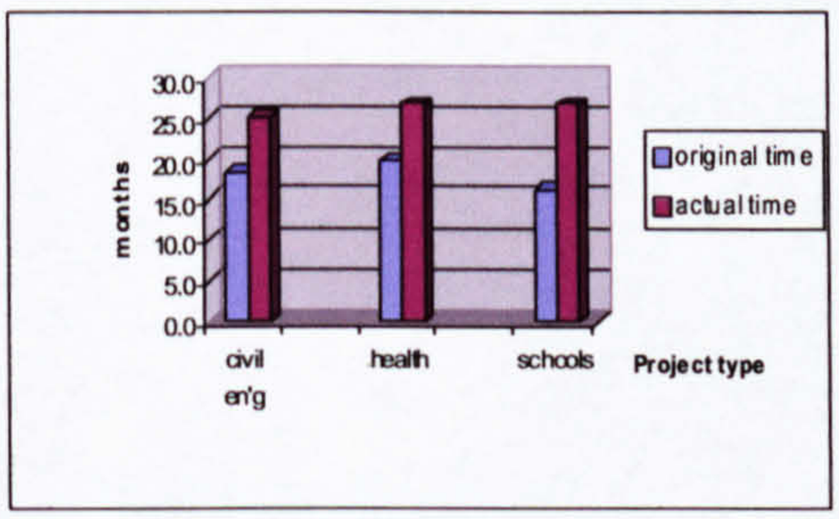
The main objectives of the research were:

i) to investigate the extent of pre-contract time and bidding/pre-contract cost overruns for projects procured using the PP/PFI strategy.

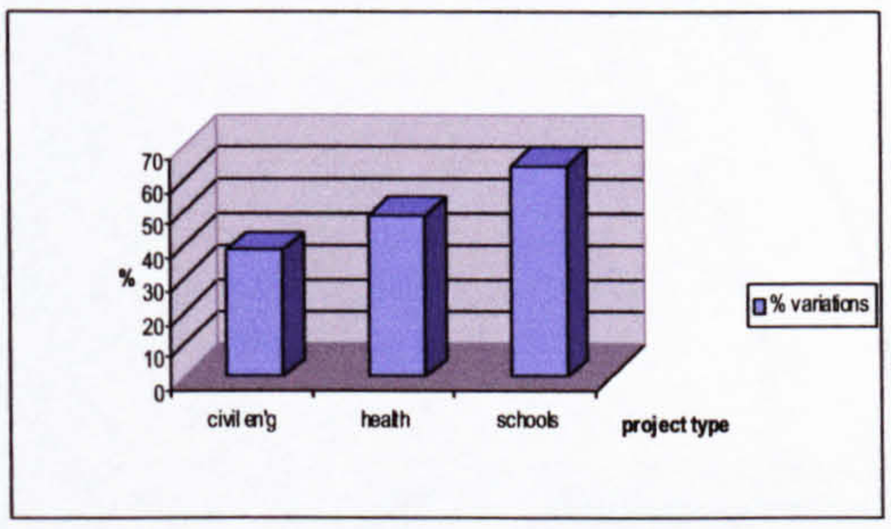
ii) to develop a generic multi-attribute hierarchical model that can be used as a guide in addressing the problems of pre-contract time and bidding/pre-contract cost overruns during the negotiations phase. Earlier research identified the negotiation phase as the one accounting for most of the time overruns.

## (1) Pre-contract time and cost outturns

The figures below reveal the extent of the pre-contract time overruns on a sector by sector (or project type) basis.




Sector by sector comparison of pre-contract time out-turns



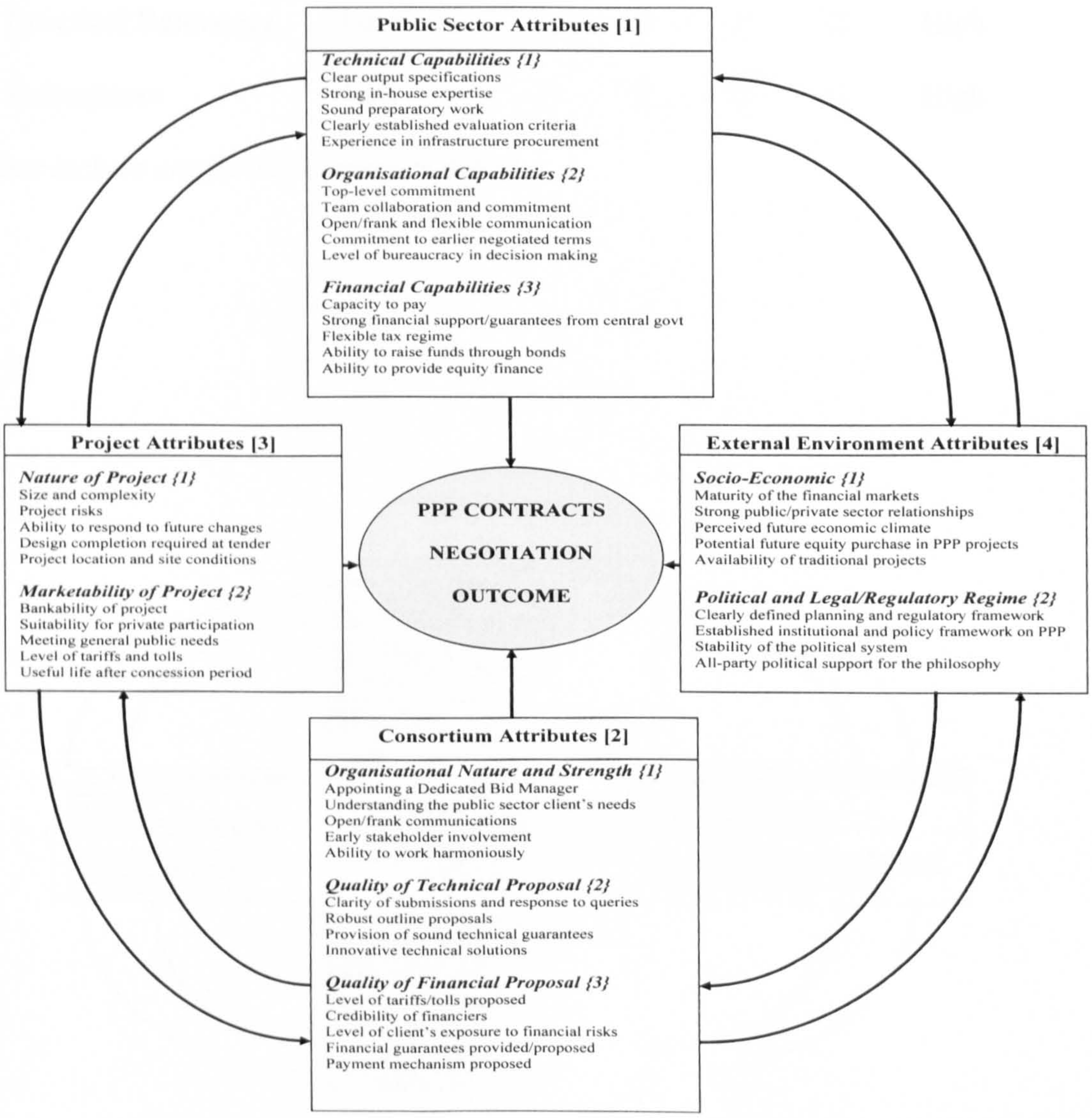

Percentage variance in pre-contract time outturn for each sector

The bidding/pre-contract cost overruns were found to be equally high, with one project recording as high as 200% overrun to the private sector. Not only were the overruns high but also the costs in monetary terms to the private sector were high, ranging from £0.1m to £6.0m. The public sector costs were equally high, ranging from £0.4 to £8m with overruns in the range of 38% – 167% over the planned budgets.

## (2) The Generic Multi-Attribute Hierarchical Model

The figure below is the model derived from analysing the data provided during the questionnaire survey. The model captures the hierarchy of attributes that significantly influence the ability of the parties to minimize the undue delays during the negotiation phase of the PPP/PFI projects procurement. The Public Sector Client Attributes, for example, have emerged as the top ranking attributes, followed by those of the Consortium Attributes. The model captures only the top five sub-attributes among the several sub-attributes identified during the questionnaire survey.

*Negotiation outcome* in this model refers to time and cost efficiency during the pre-contract stages of the PPP procurement, where efficiency relates to the ability of the parties to minimise and/or eliminate unnecessary time and cost overruns and yet strive to conclude the deals in a manner satisfactory to all parties.




**PPP and Contract Negotiations: A Generic Multi-Attribute Hierarchical Model (GmAHM)**

## Feedback on the Generic Model

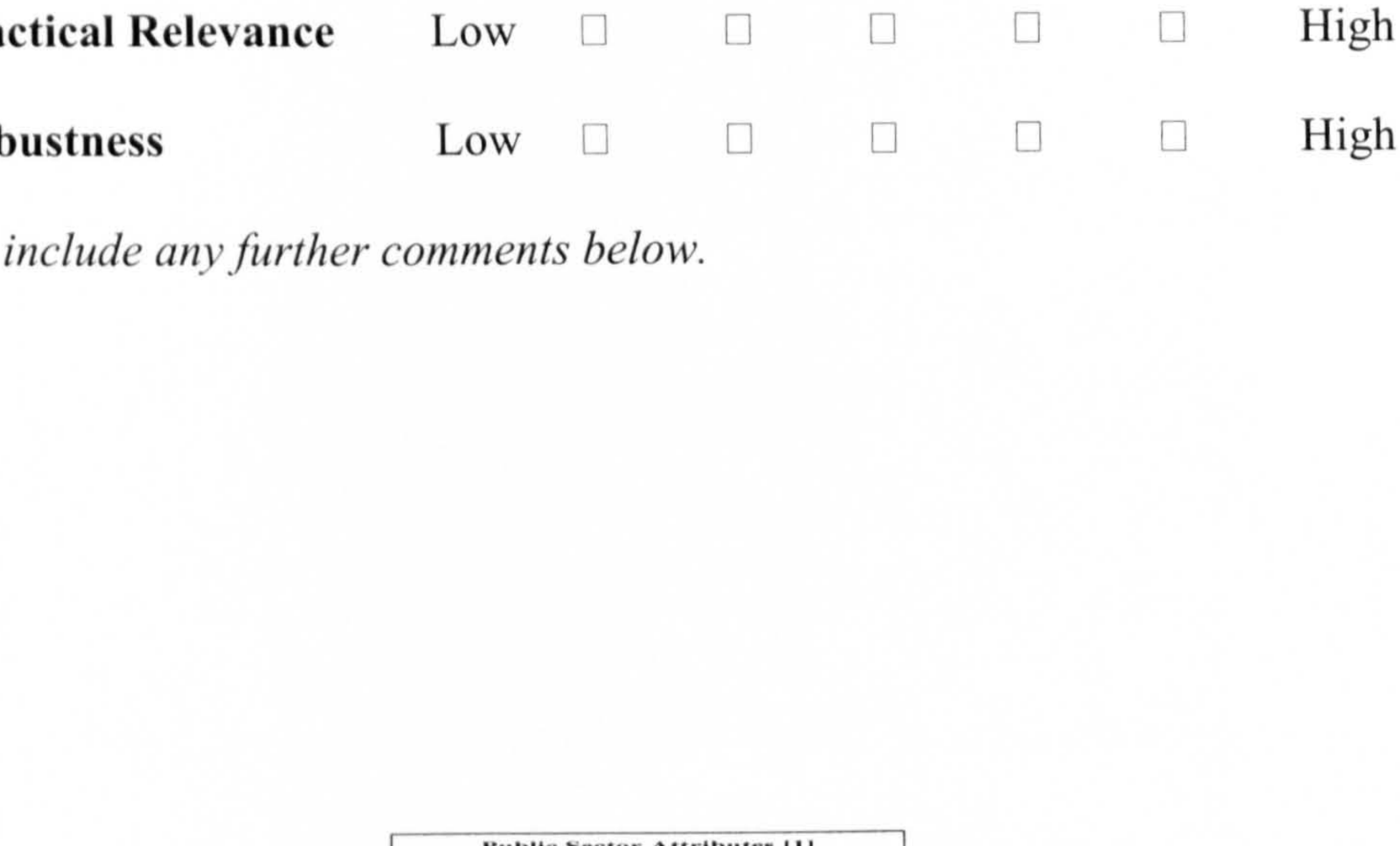
The criteria for assessing the model are as follows:

a) **Completeness**: Comprehensiveness in the coverage of the key attributes.
b) **Practical Relevance**: The usefulness of the model in identifying competency gaps.
c) **Robustness**: The extent to which the model reflects reality as a guide to decision making.

***Please rate the model according to the above criteria as follows:***

| | | **1** | **2** | **3** | **4** | **5** | |
|---|---|---|---|---|---|---|---|
| **Completeness** | Low | ☐ | ☐ | ☐ | ☐ | ☐ | High |
| **Practical Relevance** | Low | ☐ | ☐ | ☐ | ☐ | ☐ | High |
| **Robustness** | Low | ☐ | ☐ | ☐ | ☐ | ☐ | High |

*Please include any further comments below.*




**PPP and Contract Negotiations: A Generic Multi-Attribute Hierarchical Model**

# Appendix B

Appendix B.1: Pre-contract Time Out-turns

Appendix B.2: Pre-contract/Bidding Cost Out-turns

Appendix B.1 Pre-contract time out-turns

| Category | Project ID | Capital Value(£m) | original time | actual time | variation (mths) | % variation |
|---|---|---|---|---|---|---|
| health | 50 | 200 | 24 | 36 | ***12*** | ***50.0*** |
| | 49 | 50 | 21 | 30 | ***9*** | ***42.9*** |
| | 40 | 200 | 18 | 24 | ***6*** | ***33.3*** |
| | 33 | n/a | 18 | 24 | ***6*** | ***33.3*** |
| | 31 | 140 | 21 | 33 | ***12*** | ***57.1*** |
| | 19 | 300 | 18 | 21 | ***3*** | ***16.7*** |
| | 15 | 100 | 9 | 15 | ***6*** | ***66.7*** |
| | 13 | 30 | 27 | 40 | ***13*** | ***48.1*** |
| | 12 | 250 | 24 | 34 | ***10*** | ***41.7*** |
| | 3 | 229.2 | 18 | 30 | ***12*** | ***66.7*** |
| | 2 | 160 | 18 | 36 | ***18*** | ***100.0*** |
| | 1 | 170 | 24 | 36 | ***12*** | ***50.0*** |
| schools | 47 | 85.0 | 8.0 | 12.0 | ***4*** | ***50.0*** |
| | 46 | 40.0 | 26.0 | 36.0 | ***10*** | ***38.5*** |
| | 45 | 70.0 | 9.0 | 13.0 | ***4*** | ***44.4*** |
| | 42 | 75.0 | 24.0 | 24.0 | ***0*** | ***0.0*** |
| | 41 | 37.0 | 18.0 | 36.0 | ***18*** | ***100.0*** |
| | 35 | n/a | 12.0 | 21.0 | ***9*** | ***75.0*** |
| | 34 | 24.0 | 12.0 | 25.0 | ***13*** | ***108.3*** |
| | 32 | 25.0 | 15.0 | 26.0 | ***11*** | ***73.3*** |
| | 28 | 52.0 | 9.0 | 40.0 | ***31*** | ***344.4*** |
| | 27 | 91.0 | 24.0 | 36.0 | ***12*** | ***50.0*** |
| | 23 | 20.0 | 18.0 | 39.0 | ***21*** | ***116.7*** |
| | 14 | 35.0 | 24.0 | 36.0 | ***12*** | ***50.0*** |
| | 9 | 12.0 | 12.0 | 18.0 | ***6*** | ***50.0*** |
| | 8 | 40.0 | 15.0 | 24.0 | ***9*** | ***60.0*** |
| | 6 | 20 | 18.0 | 24 | ***6*** | ***33.3*** |
| | 5 | 27 | 18 | 20 | ***2*** | ***11.1*** |
| civil eng | 44 | 1000 | 12 | 18 | ***6*** | ***50.0*** |
| | 37 | 50 | 18 | 20 | ***2*** | ***11.1*** |
| | 30 | 300 | 12 | 12 | ***0*** | ***0.0*** |
| | 22 | 200 | 24 | 27 | ***3*** | ***12.5*** |
| | 20 | 25 | 12 | 24 | ***12*** | ***100.0*** |
| | 18 | 1300 | 15 | 18 | ***3*** | ***20.0*** |
| | 43 | n/a | 18 | 30 | ***12*** | ***66.7*** |
| | 16 | 98 | 15 | 12 | ***-3*** | ***-20.0*** |
| | 4 | 600 | 30 | 42 | ***12*** | ***40.0*** |
| | 36 | 120 | 12 | 24 | ***12*** | ***100.0*** |
| | 26 | 30 | 25 | 36 | ***11*** | ***44.0*** |
| | 24 | 60 | 21 | 30 | ***9*** | ***42.9*** |
| | 10 | 90 | 24 | 36 | ***12*** | ***50.0*** |
| Others(offices, courts, etc) | 21 | 8 | 24 | 36 | ***12*** | ***50.0*** |
| | 17 | 100 | 12 | 18 | ***6*** | ***50.0*** |
| | 11 | 300 | 36 | 60 | ***24*** | ***66.7*** |
| | 7 | 20 | 12 | 50 | ***38*** | ***316.7*** |
| | | ***Average*** | **18.3** | **28.5** | ***10*** | **62.5** |
| | | | n = 45 | n = 45 | n = 45 | n = 45 |

Appendix B.2: Pre-contract/Bidding Cost Out-turns

| Project Category | Project ID | Capital Value (£m) | Pre-contract/Bidding Cost Out-turns | | | | Sector |
|---|---|---|---|---|---|---|---|
| | | | original (£m) | actual (£m) | variation (£m) | % variation | |
| health | 50 | 200 | 2 | 3 | 1 | ***50*** | private |
| | 49 | 50 | 0.25 | 0.75 | 0.5 | ***200*** | private |
| | 40 | 200 | 0.4 | 0.5 | 0.1 | ***25*** | public |
| | 33 | n/a | 0.1 | 0.1 | 0 | ***0*** | private |
| | 15 | 100 | 0.28 | 0.3 | 0.02 | ***7.1*** | private |
| | 13 | 30 | 0.39 | 0.6 | 0.21 | ***53.8*** | private |
| | 3 | 229.2 | 3 | 4.5 | 1.5 | ***50*** | public |
| | 2 | 160 | 1 | 2 | 1 | ***100*** | private |
| | 1 | 170 | 0.5 | 0.5 | 0 | ***0*** | private |
| schools | 46 | 40.0 | 1.00 | 2.20 | 1.2 | ***120*** | private |
| | 45 | 70.0 | 0.20 | 0.40 | 0.2 | ***100*** | private |
| | 42 | 75.0 | 0.50 | 1.00 | 0.5 | ***100*** | public |
| | 41 | 37.0 | 1.85 | 3.70 | 1.85 | ***100*** | public |
| | 35 | n/a | 0.13 | 0.28 | 0.145 | ***111.5*** | private |
| | 34 | 24.0 | 0.8 | 1.20 | 0.4 | ***50*** | public |
| | 32 | 25.0 | 0.35 | 0.55 | 0.2 | ***57.1*** | public |
| | 28 | 52.0 | 0.6 | 1.40 | 0.8 | ***133.3*** | private |
| | 27 | 91.0 | 0.75 | 1.00 | 0.25 | ***33.3*** | public |
| | 14 | 35.0 | 0.4 | 0.7 | 0.3 | ***75*** | private |
| | 9 | 12.0 | 0.4 | 0.4 | 0 | ***0*** | public |
| | 8 | 40.0 | 1.19 | 1.2 | 0.01 | ***0.8*** | public |
| | 6 | 20 | 0.4 | 0.5 | 0.1 | ***25*** | private |
| civil eng | 30 | 300 | 6 | 6 | 0 | ***0*** | private |
| | 18 | 1300 | 1.25 | 1.25 | 0 | ***0*** | public |
| | 16 | 98 | 1 | 0.5 | -0.5 | ***-50*** | public |
| | 4 | 600 | 8 | 11 | 3 | ***37.5*** | public |
| | 36 | 120 | 0.5 | 1 | 0.5 | ***100.00*** | private |
| | 26 | 30 | 0.5 | 1 | 0.5 | ***100.00*** | private |
| | 24 | 60 | 1.5 | 3 | 1.5 | ***100.00*** | public |
| Others(offices, | 17 | 100 | 1 | 1.6 | 0.6 | ***60*** | public |
| | 11 | 300 | 2 | 4 | 2 | ***100*** | public |
| | 7 | 20 | 0.75 | 2 | 1.25 | ***166.7*** | public |

# Appendix C

Appendix C.1: Statistical Computations for the Model Development and Testing (Hypothesis 2)

Appendix C.2: Comprehensive listing of the hierarchy of Attributes

Appendix C.3: Statistical Computations for validating the Model

Appendix C.4 Analysis of Feedback on the Generic Model

**Appendix C.1 Statistical Computations for the Model Development and Testing (Hypothesis 2)**

## Summary Statistics for Model Development and Testing (Hypothesis 2)

| Main Components | Main Attributes | The Model Results (n = 49) | | Split-Half Results | | | | Spearman's Correlation Coefficient $\sigma$ | Kendall's Coefficient of Concordance $W$ | Statistical test of Significance (one-tail test) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Split 1 (n = 24) | | Split 2 (n = 25) | | | | |
| | | Relative Significance Index | Ranking | Relative Significance Index | Ranking | Relative Significance Index | Ranking | | | |
| The Consortium | *Nature and Strength* | 0.738 | 1 | 0.740 | 1 | 0.736 | 1 | 0.935 | 0.957 | $p < 0.001$ |
| | *Quality of Technical Proposal* | 0.723 | 2 | 0.738 | 2 | 0.710 | 2 | | | |
| | *Quality of the Financial Proposal* | 0.652 | 3 | 0.648 | 3 | 0.656 | 3 | | | |
| The Public Sector Client | *Organisational Capabilities* | 0.736 | 2 | 0.735 | 1 | 0.737 | 2 | 0.838 | 0.892 | $p < 0.001$ |
| | *Technical Capabilities* | 0.739 | 1 | 0.726 | 2 | 0.751 | 1 | | | |
| | *Financial Capabilities* | 0.578 | 3 | 0.563 | 3 | 0.592 | 3 | | | |
| The Project | *Nature of Project* | 0.665 | 1 | 0.657 | 1 | 0.684 | 1 | 0.949 | 0.966 | $p < 0.001$ |
| | *Marketability of Project* | 0.656 | 2 | 0.633 | 2 | 0.678 | 2 | | | |
| The External Environment | *Socio-Economic* | 0.673 | 1 | 0.635 | 1 | 0.710 | 1 | 0.898 | 0.932 | $p < 0.001$ |
| | *Political/Legal/Regulatory regime* | 0.623 | 2 | 0.604 | 2 | 0.641 | 2 | | | |

## General Rating of Consortium Attributes

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | project ID | 50 | 49 | 40 | 38 | 33 | 31 | 29 | 19 | 15 | 13 | 12 | 3 | 2 | 1 | 48 | 47 | 46 | 45 | 42 | 41 | 39 | 35 | 34 | 32 | 28 | 27 | 23 | 14 | 9 | 8 | 6 | 5 | 21 | 17 | 11 | 7 | 44 | 37 | 30 | 22 | 20 | 18 | 43 | 36 | 26 | 24 | 16 | 10 | 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondent | pr | pr | pu | pu | pr | pu | pr | pr | pr | pr | pu | pu | pr | pr | pr | pr | pr | pr | pu | pu | pu | pr | pu | pu | pr | pu | pr | pr | pu | pr | pu | pu | pr | pu | pu | pu | pr | pu | pr | pr | pu | pu | pr | pr | pu | pu | pr | pu | | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | off | off | rdt | sll | rdt | rdt | rdt | rdt | rlt | fld | fld | w/s | rlt | w/s | rlt | | | |
| | **Attributes** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | isub | imain | |
| | **Nature and Strength** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.738 |
| cs1 | Previous experience in PPP procurement. | 4 | 4 | 5 | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 2 | 5 | 3 | 3 | 5 | 3 | 3 | 5 | 5 | 2 | 4 | 3 | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 5 | 1 | 2 | 5 | 4 | 2 | 2 | 5 | 4 | 5 | 3 | 4 | 3 | 3 | 4 | 5 | 5 | 0.792 | |
| cs2 | Reputation enjoyed by the consortium. | 4 | 4 | 5 | 3 | 4 | 4 | 4 | 5 | 5 | 4 | 4 | 4 | 3 | 3 | 1 | 4 | 4 | 4 | 2 | 3 | 3 | 2 | 1 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 3 | 3 | 5 | 3 | 5 | 3 | 5 | 4 | 5 | 5 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 4 | 0.702 |
| cs3 | PPP being a strategic business interest | 4 | 2 | 5 | 4 | 5 | 4 | 5 | 4 | 1 | 4 | 3 | 4 | 3 | 4 | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 1 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 5 | 3 | 3 | 3 | 1 | 2 | 5 | 4 | 2 | 5 | 5 | 1 | 4 | 4 | 3 | 3 | 2 | 5 | 1 | 4 | 0.686 |
| cs4 | Ability to tie equity into the project for a long period. | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 3 | 1 | 4 | 3 | 5 | 1 | 3 | 2 | 4 | 4 | 3 | 4 | 3 | 3 | 2 | 3 | 4 | 4 | 2 | 4 | 5 | 4 | 4 | 5 | 2 | 1 | 5 | 4 | 5 | 4 | 3 | 1 | 5 | 5 | 3 | 3 | 4 | 4 | 4 | 4 | 1 | 5 | 0.682 | |
| cs5 | Readiness to accept risk. | 4 | 4 | 3 | 4 | 5 | 5 | 4 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 4 | 3 | 5 | 1 | 5 | 3 | 4 | 4 | 3 | 4 | 4 | 5 | 4 | 3 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 5 | 0.816 |
| cs6 | Open/frank communication during the negotiations. | 5 | 4 | 3 | 4 | 5 | 4 | 5 | 5 | 3 | 3 | 4 | 5 | 3 | 4 | 3 | 5 | 5 | 4 | 5 | 3 | 5 | 5 | 3 | 5 | 3 | 4 | 5 | 5 | 4 | 3 | 5 | 5 | 3 | 5 | 5 | 4 | 4 | 5 | 3 | 4 | 5 | 5 | 4 | 3 | 5 | 3 | 5 | 4 | 4 | 2 | 5 | 0.841 |
| cs7 | Willingness to commit to earlier negotiated terms. | 4 | 3 | 3 | 3 | 5 | 4 | 4 | 3 | 5 | 3 | 3 | 5 | 3 | 4 | 4 | 5 | 5 | 4 | 4 | 3 | 3 | 3 | 5 | 5 | 4 | 5 | 4 | 3 | 3 | 2 | 4 | 4 | 3 | 3 | 4 | 4 | 5 | 3 | 4 | 5 | 5 | 4 | 3 | 5 | 2 | 4 | 1 | 3 | 2 | 5 | 0.751 |
| cs8 | Current job holding of consortium members. | 4 | 3 | 2 | 2 | 4 | 2 | 4 | 3 | 1 | 4 | 3 | 2 | 3 | 3 | 2 | 4 | 4 | 4 | 5 | 3 | 4 | 3 | 4 | 2 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 2 | 5 | 1 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 1 | 3 | 1 | 4 | 0.604 |
| cs9 | Appointing a dedicated bid manager | 5 | 3 | 3 | 3 | 5 | 3 | 4 | 5 | 3 | 4 | 5 | 4 | 4 | 5 | 1 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 3 | 3 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 5 | 4 | 6 | 3 | 5 | 4 | 5 | 4 | 5 | 5 | 0.865 |
| cs10 | Ability to understand what the public sector wants. | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 1 | 5 | 4 | 4 | 5 | 2 | 4 | 3 | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 1 | 4 | 0.853 |
| cs11 | Ability of consortium members to work harmoniously | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 3 | 4 | 4 | 4 | 4 | 5 | 3 | 4 | 4 | 5 | 4 | 4 | 3 | 4 | 2 | 5 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 3 | 5 | 4 | 4 | 3 | 5 | 3 | 5 | 4 | 4 | 3 | 0.820 |
| cs12 | Experience of previously working together as a team | 4 | 4 | 3 | 2 | 5 | 4 | 5 | 5 | 4 | 4 | 3 | 2 | 4 | 5 | 1 | 4 | 4 | 4 | 3 | 1 | 1 | 2 | 1 | 5 | 3 | 3 | 5 | 4 | 4 | 3 | 3 | 2 | 4 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 2 | 1 | 3 | 3 | 3 | 2 | 4 | 3 | 4 | 0.665 |
| cs13 | Taking proactive role in initiating the project. | 4 | 4 | 2 | 3 | 3 | 1 | 5 | 5 | 1 | 4 | 4 | 4 | 4 | 3 | 3 | 4 | 4 | 4 | 3 | 4 | 3 | 2 | 1 | 4 | 4 | 3 | 4 | 3 | 4 | 4 | 4 | 2 | 3 | 3 | 2 | 4 | 3 | 3 | 5 | 2 | 4 | 3 | 3 | 1 | 2 | 1 | 3 | 1 | 4 | 0.629 |
| cs14 | Ability to obtain planning permission timeously. | 4 | 3 | 3 | 3 | 5 | 3 | 4 | 4 | 1 | 5 | 4 | 4 | 4 | 3 | 5 | 4 | 4 | 2 | 5 | 2 | 3 | 4 | 1 | 3 | 4 | 5 | 4 | 2 | 4 | 5 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | 3 | 1 | 1 | 1 | 4 | 2 | 4 | 2 | 2 | 5 | 2 | 1 | 4 | 0.657 |
| cs15 | Early involvement of other stakeholders | 5 | 4 | 3 | 3 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 3 | 4 | 4 | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 4 | 5 | 3 | 4 | 5 | 4 | 5 | 3 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 5 | 3 | 5 | 4 | 2 | 3 | 3 | 0.833 |
| cs16 | Personal attributes of the champion within the consortium. | 5 | 3 | 5 | 2 | 3 | 5 | 5 | 5 | 3 | 4 | 3 | 4 | 4 | 5 | 2 | 4 | 4 | 5 | 4 | 3 | 4 | 5 | 5 | 4 | 3 | 4 | 4 | 3 | 4 | 3 | 4 | 2 | 3 | 4 | 3 | 5 | 3 | 3 | 5 | 5 | 3 | 3 | 3 | 4 | 3 | 2 | 5 | 3 | 5 | 0.755 |
| cs17 | Ability to persevere during protracted negotiations. | 5 | 4 | 3 | 4 | 4 | 4 | 5 | 4 | 3 | 3 | 4 | 5 | 4 | 5 | 2 | 5 | 4 | 5 | 4 | 5 | 3 | 2 | 1 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 3 | 5 | 5 | 4 | 4 | 4 | 3 | 3 | 3 | 0.812 |
| cs18 | The multidisciplinary nature of consortium team | 4 | 3 | 4 | 3 | 5 | 2 | 5 | 3 | 3 | 4 | 3 | 4 | 4 | 3 | 2 | 3 | 5 | 2 | 4 | 3 | 2 | 3 | 3 | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 2 | 4 | 3 | 3 | 3 | 4 | 5 | 3 | 4 | 5 | 3 | 3 | 4 | 3 | 2 | 4 | 3 | 0.669 |
| cs19 | Experience of previously working with the public sector procurer | 4 | 2 | 1 | 4 | 2 | 1 | 5 | 5 | 1 | 4 | 2 | 3 | 4 | 3 | 1 | 3 | 4 | 2 | 4 | 1 | 3 | 1 | 1 | 3 | 3 | 3 | 3 | 4 | 3 | 4 | 5 | 4 | 2 | 2 | 3 | 2 | 4 | 5 | 3 | 4 | 5 | 4 | 1 | 2 | 1 | 4 | 3 | 4 | 3 | 4 | 0.596 |
| | | 80 | 65 | 65 | 63 | 84 | 68 | 87 | 81 | 56 | 74 | 69 | 75 | 67 | 73 | 48 | 80 | 80 | 73 | 78 | 65 | 64 | 62 | 47 | 78 | 67 | 71 | 80 | 70 | 73 | 74 | 82 | 62 | 68 | 68 | 66 | 88 | 76 | 66 | 79 | 86 | 66 | 64 | 67 | 58 | 64 | 57 | 73 | 48 | 82 | | |
| | **Quality of Technical Proposal** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.723 |
| ct1 | Robustness of outline technical proposal | 4 | 4 | 3 | 3 | 5 | 4 | 4 | 3 | 4 | 4 | 3 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 1 | 5 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 4 | 5 | 5 | 5 | 5 | 4 | 3 | 3 | 5 | 4 | 3 | 5 | 4 | 3 | 0.780 |
| ct2 | Clarity of submissions and responses to queries | 4 | 3 | 3 | 4 | 5 | 3 | 4 | 4 | 4 | 3 | 3 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 5 | 2 | 2 | 5 | 4 | 4 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 2 | 4 | 5 | 3 | 0.800 |
| ct3 | Innovative technical solutions. | 3 | 3 | 3 | 3 | 5 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 4 | 5 | 3 | 4 | 3 | 3 | 5 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 3 | 2 | 4 | 3 | 4 | 1 | 3 | 4 | 3 | 3 | 0.673 |
| ct4 | Provision of sound technical guarantee | 4 | 3 | 1 | 2 | 4 | 2 | 4 | 3 | 4 | 3 | 4 | 5 | 3 | 5 | 3 | 4 | 3 | 3 | 2 | 4 | 1 | 1 | 2 | 4 | 4 | 3 | 4 | 5 | 4 | 4 | 3 | 2 | 4 | 5 | 3 | 4 | 4 | 3 | 5 | 5 | 3 | 4 | 3 | 4 | 4 | 1 | 3 | 4 | 3 | | |
| | | 15 | 13 | 10 | 12 | 19 | 12 | 15 | 14 | 16 | 13 | 13 | 16 | 14 | 18 | 15 | 16 | 14 | 15 | 12 | 14 | 7 | 5 | 13 | 16 | 17 | 15 | 17 | 17 | 15 | 17 | 14 | 13 | 15 | 16 | 11 | 16 | 18 | 16 | 20 | 20 | 14 | 14 | 15 | 16 | 16 | 7 | 15 | 16 | 12 | | |
| | **Quality of the Financial Proposal** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.652 |
| cf1 | Level of financial guarantees provided/proposed by the consortium | 4 | 3 | 4 | 4 | 4 | 2 | 3 | 4 | 3 | 3 | 3 | 5 | 3 | 3 | 4 | 4 | 4 | 3 | 2 | 3 | 2 | 1 | 5 | 4 | 3 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 5 | 5 | 2 | 4 | 4 | 4 | 5 | 5 | 4 | 3 | 3 | 4 | 4 | 2 | 4 | 4 | 4 | 0.739 |
| cf2 | Payment mechanisms proposed | 5 | 3 | 4 | 4 | 5 | 3 | 4 | 4 | 3 | 3 | 4 | 4 | 4 | 3 | 4 | 4 | 2 | 3 | 2 | 5 | 1 | 1 | 5 | 5 | 3 | 4 | 4 | 5 | 3 | 5 | 4 | 3 | 4 | 3 | 2 | 4 | 4 | 3 | 5 | 5 | 2 | 5 | 5 | 4 | 4 | 1 | 4 | 4 | 4 | 0.731 |
| cf3 | Level of government funding/guarantees required by the consortium | 4 | 3 | 4 | 3 | 5 | 4 | 4 | 3 | 1 | 3 | 3 | 2 | 3 | 3 | 3 | 4 | 3 | 4 | 2 | 5 | 1 | 1 | 3 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 4 | 2 | 4 | 3 | 3 | 5 | 4 | 2 | 3 | 5 | 3 | 5 | 4 | 2 | 2 | 1 | 4 | 2 | 4 | 0.641 |
| cf4 | Levels of tariff/tolls proposed | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 4 | 5 | 4 | 3 | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 3 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 2 | 5 | 5 | 4 | 5 | 5 | 3 | 5 | 5 | 5 | 4 | 0.845 |
| cf5 | Credibility of financiers | 3 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 3 | 4 | 3 | 3 | 4 | 5 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 5 | 3 | 4 | 5 | 4 | 4 | 3 | 3 | 3 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 3 | 3 | 5 | 3 | 3 | 3 | 5 | 4 | 4 | 0.767 |
| cf6 | Level of exposure of the public sector organisation to financial risks | 4 | 4 | 4 | 4 | 3 | 5 | 4 | 4 | 5 | 3 | 4 | 5 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 1 | 3 | 5 | 5 | 3 | 4 | 4 | 5 | 4 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | 5 | 5 | 3 | 1 | 5 | 4 | 4 | 4 | 4 | 3 | 1 | 5 | 5 | 0.763 |
| cf7 | Level of financial returns to the public sector organisation. | 3 | 3 | 4 | 4 | 3 | 1 | 2 | 3 | 1 | 3 | 4 | 4 | 1 | 3 | 3 | 3 | 2 | 5 | 1 | 3 | 1 | 1 | 1 | 3 | 4 | 2 | 5 | 4 | 4 | 1 | 3 | 1 | 2 | 5 | 3 | 5 | 4 | 3 | 1 | 5 | 2 | 3 | 4 | 1 | 2 | 1 | 3 | 1 | 4 | 0.551 |
| cf8 | Length of concession period proposed. | 4 | 2 | 3 | 4 | 3 | 3 | 1 | 3 | 3 | 4 | 3 | 2 | 3 | 3 | 3 | 4 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 3 | 3 | 2 | 4 | 3 | 3 | 2 | 3 | 1 | 2 | 3 | 4 | 5 | 4 | 3 | 5 | 5 | 2 | 2 | 4 | 3 | 3 | 1 | 4 | 1 | 4 | 0.567 |
| cf9 | Level of third party revenue to be generated. | 3 | 2 | 3 | 3 | 3 | 1 | 1 | 2 | 1 | 4 | 2 | 2 | 1 | 2 | 2 | 4 | 1 | 3 | 1 | 2 | 1 | 1 | 1 | 3 | 2 | 2 | 4 | 3 | 3 | 1 | 2 | 1 | 2 | 5 | 4 | 2 | 2 | 2 | 5 | 5 | 1 | 2 | 3 | 2 | 1 | 1 | 2 | 2 | 3 | 0.453 |
| cf10 | High Equity/debt ratio so as to drive commitment. | 3 | 3 | 1 | 3 | 3 | 2 | 1 | 2 | 1 | 3 | 2 | 3 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 | 3 | 1 | 4 | 3 | 2 | 4 | 1 | 3 | 4 | 2 | 2 | 1 | 3 | 3 | 3 | 3 | 4 | 1 | 4 | 1 | 2 | 2 | 4 | 4 | 2 | 1 | 3 | 1 | 3 | 0.465 |
| | | 37 | 31 | 35 | 37 | 37 | 30 | 26 | 33 | 26 | 33 | 31 | 35 | 25 | 29 | 33 | 38 | 27 | 35 | 26 | 34 | 17 | 19 | 30 | 41 | 31 | 33 | 43 | 38 | 35 | 30 | 32 | 25 | 33 | 40 | 33 | 43 | 40 | 28 | 39 | 46 | 27 | 34 | 41 | 32 | 27 | 17 | 39 | 29 | 38 | | |

*Notes*

$$(isub) = \sum_{i=1}^{n} r/(r^* xn)$$

$$(imain) = \sum_{i=1}^{n} r/(r^* xnxN)$$

where $(isub)$ = the relative significance index for the sub-attributes;
$(imain)$ = the relative significance index for the main attributes;
r = the degree of significance assigned by each respondent to the $i$th attribute;
$r^*$ = the ideal or anchor score i.e. highest score (5 in this case):
n = the number of responses;
N = the total number of sub-attributes under each main attribut

pr = private
pu = public
hlth = health
sch = school
off = offices
rdt = road transport
fld = flood defence
w/s = water and sewerage
rlt = rail transport

# General Rating of Consortium Attributes - Split 1

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | Attributes | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | project ID | 19 | 15 | 13 | 12 | 3 | 2 | 1 | 32 | 28 | 27 | 23 | 14 | 9 | 8 | 6 | 5 | 11 | 7 | 36 | 26 | 24 | 16 | 10 | 4 | | |
| | respondent | pr | pr | pr | pu | pu | pr | pr | pu | pr | pu | pr | pr | pu | pu | pr | pu | pu | pu | pr | pr | pu | pu | pr | pu | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | fld | fld | w/s | rlt | w/s | rlt | isub | imain |
| | **Nature and Strength** | | | | | | | | | | | | | | | | | | | | | | | | | | 0.740 |
| cs1 | Previous expenence in PPP procurement. | 5 | 5 | 5 | 4 | 2 | 5 | 3 | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 2 | 5 | 4 | 3 | 3 | 4 | 5 | 5 | 0.825 | |
| cs2 | Reputation enjoyed by the consortium. | 5 | 5 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 3 | 3 | 5 | 2 | 2 | 2 | 3 | 3 | 4 | 0.725 | |
| cs3 | PPP being a strategic business interest | 4 | 1 | 4 | 3 | 4 | 3 | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 3 | 2 | 5 | 3 | 3 | 2 | 5 | 1 | 4 | 0.675 | |
| cs4 | Ability to tie equity into the project for a long period. | 3 | 1 | 4 | 3 | 5 | 1 | 3 | 4 | 4 | 2 | 4 | 5 | 4 | 4 | 5 | 2 | 4 | 5 | 4 | 4 | 4 | 4 | 1 | 5 | 0.708 | |
| cs5 | Readiness to accept risk. | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 5 | 3 | 4 | 4 | 3 | 4 | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 0.817 | |
| cs6 | Open/frank communication during the negotiations. | 5 | 3 | 3 | 4 | 5 | 3 | 4 | 5 | 3 | 4 | 5 | 5 | 4 | 3 | 5 | 5 | 5 | 5 | 3 | 5 | 4 | 4 | 2 | 5 | 0.825 | |
| cs7 | Willingness to commit to earlier negotiated terms. | 3 | 5 | 3 | 3 | 5 | 3 | 4 | 5 | 4 | 5 | 4 | 3 | 3 | 2 | 4 | 4 | 4 | 5 | 2 | 4 | 1 | 3 | 2 | 5 | 0.717 | |
| cs8 | Current job holding of consortium members. | 3 | 1 | 4 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 2 | 4 | 4 | 1 | 2 | 1 | 3 | 1 | 4 | 0.550 | |
| cs9 | Appointing a dedicated bid manager | 5 | 3 | 4 | 5 | 4 | 4 | 5 | 5 | 4 | 4 | 5 | 3 | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 0.892 | |
| cs10 | Ability to understand what the public sector wants. | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 2 | 4 | 3 | 5 | 4 | 4 | 5 | 4 | 4 | 3 | 5 | 3 | 5 | 0.808 | |
| cs11 | Ability of consortium members to work harmoniously. | 4 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 3 | 5 | 3 | 5 | 0.808 | |
| cs12 | Expenence of previously working together as a team | 5 | 4 | 4 | 3 | 2 | 4 | 5 | 5 | 3 | 3 | 5 | 4 | 4 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 4 | 3 | 4 | 0.700 | |
| cs13 | Taking proactive role in initiating the project. | 5 | 1 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 3 | 4 | 3 | 4 | 4 | 4 | 2 | 2 | 4 | 1 | 2 | 1 | 3 | 1 | 4 | 0.625 | |
| cs14 | Ability to obtain planning permission timeously. | 4 | 1 | 5 | 4 | 4 | 4 | 3 | 3 | 4 | 5 | 4 | 2 | 4 | 5 | 3 | 4 | 4 | 4 | 2 | 2 | 5 | 2 | 1 | 4 | 0.692 | |
| cs15 | Early involvement of other stakeholders | 5 | 5 | 4 | 4 | 5 | 3 | 4 | 4 | 4 | 5 | 4 | 5 | 3 | 4 | 5 | 4 | 4 | 5 | 2 | 3 | 3 | 4 | 3 | 4 | 0.800 | |
| cs16 | Personal attributes of the champion within the consortium. | 5 | 3 | 4 | 3 | 4 | 4 | 5 | 4 | 3 | 4 | 4 | 3 | 4 | 3 | 4 | 2 | 3 | 5 | 4 | 3 | 2 | 5 | 3 | 5 | 0.742 | |
| cs17 | Ability to persevere during protracted negotiations. | 4 | 3 | 3 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 5 | 4 | 4 | 4 | 3 | 3 | 0.833 | |
| cs18 | The multidisciplinary nature of consortium team. | 3 | 3 | 4 | 3 | 4 | 4 | 3 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 2 | 3 | 4 | 2 | 3 | 3 | 3 | 2 | 3 | 0.650 | |
| cs19 | Expenence of previously working with the public sector procurer. | 5 | 1 | 4 | 2 | 3 | 4 | 3 | 3 | 3 | 3 | 4 | 3 | 4 | 5 | 4 | 2 | 2 | 4 | 1 | 4 | 3 | 4 | 3 | 4 | 0.650 | |
| | | 81 | 56 | 74 | 69 | 75 | 67 | 73 | 78 | 67 | 71 | 80 | 70 | 73 | 74 | 82 | 62 | 66 | 88 | 58 | 64 | 57 | 73 | 48 | 82 | | |
| | **Quality of Technical Proposal** | | | | | | | | | | | | | | | | | | | | | | | | | | 0.738 |
| ct1 | Robustness of outline technical proposal. | 3 | 4 | 4 | 3 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 2 | 4 | 5 | 4 | 3 | 5 | 4 | 3 | 0.783 | |
| ct2 | Clarity of submissions and responses to quenes | 4 | 4 | 3 | 3 | 4 | 4 | 5 | 4 | 4 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 2 | 4 | 5 | 3 | 0.783 | |
| ct3 | Innovative technical solutions. | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 4 | 5 | 3 | 4 | 3 | 3 | 5 | 3 | 3 | 3 | 4 | 3 | 4 | 1 | 3 | 3 | 3 | 0.667 | |
| ct4 | Provision of sound technical guarantee. | 3 | 4 | 3 | 4 | 5 | 3 | 5 | 4 | 4 | 3 | 4 | 5 | 4 | 4 | 3 | 2 | 3 | 4 | 4 | 4 | 1 | 3 | 4 | 3 | 0.717 | |
| | | 14 | 16 | 13 | 13 | 16 | 14 | 18 | 16 | 17 | 15 | 17 | 17 | 15 | 17 | 14 | 13 | 11 | 16 | 16 | 16 | 7 | 15 | 16 | 12 | | |
| | **Quality of the Financial Proposal** | | | | | | | | | | | | | | | | | | | | | | | | | | 0.648 |
| cf1 | Level of financial guarantees provided/proposed by the consortium. | 4 | 3 | 3 | 3 | 5 | 3 | 3 | 4 | 3 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 2 | 4 | 4 | 4 | 2 | 4 | 4 | 4 | 0.758 | |
| cf2 | Payment mechanisms proposed | 4 | 3 | 3 | 4 | 4 | 4 | 3 | 5 | 3 | 4 | 4 | 5 | 3 | 5 | 4 | 3 | 2 | 4 | 4 | 4 | 1 | 4 | 4 | 4 | 0.733 | |
| cf3 | Level of government funding/guarantees required by the consortium. | 3 | 1 | 3 | 3 | 2 | 3 | 3 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 4 | 2 | 3 | 5 | 2 | 2 | 1 | 4 | 2 | 4 | 0.592 | |
| cf4 | Levels of tariff/tolls proposed | 4 | 5 | 4 | 3 | 4 | 3 | 3 | 5 | 4 | 5 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 5 | 5 | 3 | 5 | 5 | 5 | 4 | 0.825 | |
| cf5 | Credibility of financiers | 4 | 3 | 3 | 3 | 4 | 3 | 3 | 5 | 3 | 4 | 5 | 4 | 4 | 3 | 3 | 3 | 4 | 5 | 3 | 3 | 3 | 5 | 4 | 4 | 0.733 | |
| cf6 | Level of exposure of the public sector organisation to financial risks | 4 | 5 | 3 | 4 | 5 | 3 | 4 | 5 | 3 | 4 | 4 | 5 | 4 | 3 | 3 | 4 | 4 | 5 | 4 | 3 | 1 | 5 | 5 | 4 | 0.783 | |
| cf7 | Level of financial returns to the public sector organisation. | 3 | 1 | 3 | 4 | 4 | 1 | 3 | 3 | 4 | 2 | 5 | 4 | 4 | 1 | 3 | 1 | 3 | 5 | 1 | 2 | 1 | 3 | 1 | 4 | 0.550 | |
| cf8 | Length of concession period proposed. | 3 | 3 | 4 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 4 | 3 | 3 | 2 | 3 | 1 | 4 | 5 | 3 | 3 | 1 | 4 | 1 | 4 | 0.583 | |
| cf9 | Level of third party revenue to be generated. | 2 | 1 | 4 | 2 | 2 | 1 | 2 | 3 | 2 | 2 | 4 | 3 | 3 | 1 | 2 | 1 | 4 | 2 | 2 | 1 | 1 | 2 | 2 | 3 | 0.433 | |
| cf10 | High Equity/debt ratio so as to drive commitment. | 2 | 1 | 3 | 2 | 3 | 1 | 2 | 4 | 3 | 2 | 4 | 1 | 3 | 4 | 2 | 2 | 3 | 3 | 4 | 2 | 1 | 3 | 1 | 3 | 0.492 | |

# General Rating of Consortium Attributes - Split 2

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | project ID | 50 | 49 | 40 | 38 | 33 | 31 | 29 | 48 | 47 | 46 | 45 | 42 | 41 | 39 | 35 | 34 | 21 | 17 | 44 | 37 | 30 | 22 | 20 | 18 | 43 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondent | pr | pr | pu | pu | pr | pu | pr | pr | pr | pr | pr | pu | pu | pu | pr | pu | pr | pu | pr | pu | pr | pr | pu | pu | pu | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | rdt | stl | rdt | rdt | rdt/b | rdt | rlt | | |
| | **Attributes** | | | | | | | | | | | | | | | | | | | | | | | | | | **isub** | **imain** |
| | **Nature and Strength** | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.736** |
| cs1 | Previous experience in PPP procurement. | 4 | 4 | 5 | 3 | 5 | 5 | 5 | 3 | 5 | 3 | 3 | 5 | 5 | 2 | 4 | 3 | 5 | 1 | 4 | 2 | 2 | 5 | 4 | 5 | 3 | **0.760** | |
| cs2 | Reputation enjoyed by the consortium. | 4 | 4 | 5 | 3 | 4 | 4 | 4 | 1 | 4 | 4 | 4 | 2 | 3 | 3 | 2 | 1 | 3 | 5 | 3 | 4 | 5 | 5 | 2 | 3 | 3 | **0.680** | |
| cs3 | PPP being a strategic business interest | 4 | 2 | 5 | 4 | 5 | 4 | 5 | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 1 | 3 | 1 | 4 | 2 | 5 | 5 | 1 | 4 | 4 | **0.696** | |
| cs4 | Ability to tie equity into the project for a long period. | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 2 | 4 | 4 | 3 | 4 | 3 | 3 | 2 | 3 | 1 | 5 | 4 | 3 | 1 | 5 | 5 | 3 | 3 | **0.656** | |
| cs5 | Readiness to accept risk. | 4 | 4 | 3 | 4 | 5 | 5 | 4 | 3 | 4 | 4 | 4 | 5 | 4 | 3 | 5 | 1 | 3 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | **0.816** | |
| cs6 | Open/frank communication during the negotiations. | 5 | 4 | 3 | 4 | 5 | 4 | 5 | 3 | 5 | 5 | 4 | 5 | 3 | 5 | 5 | 3 | 3 | 5 | 4 | 5 | 5 | 5 | 4 | 3 | 5 | **0.856** | |
| cs7 | Willingness to commit to earlier negotiated terms. | 4 | 3 | 3 | 3 | 5 | 4 | 4 | 4 | 5 | 5 | 4 | 4 | 3 | 3 | 3 | 5 | 3 | 4 | 3 | 4 | 5 | 5 | 4 | 3 | 5 | **0.784** | |
| cs8 | Current job holding of consortium members. | 4 | 3 | 2 | 2 | 4 | 2 | 4 | 2 | 4 | 4 | 4 | 5 | 3 | 4 | 3 | 4 | 5 | 1 | 4 | 4 | 3 | 3 | 3 | 3 | 2 | **0.656** | |
| cs9 | Appointing a dedicated bid manager | 5 | 3 | 3 | 3 | 5 | 3 | 4 | 1 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 4 | 6 | 3 | **0.840** | |
| cs10 | Ability to understand what the public sector wants. | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 1 | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 4 | **0.872** | |
| cs11 | Ability of consortium members to work harmoniously. | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 3 | 4 | 4 | 5 | 4 | 4 | 3 | 4 | 2 | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 3 | 5 | **0.832** | |
| cs12 | Experience of previously working together as a team | 4 | 4 | 3 | 2 | 5 | 4 | 5 | 1 | 4 | 4 | 4 | 3 | 1 | 1 | 2 | 1 | 4 | 3 | 4 | 4 | 5 | 5 | 2 | 1 | 3 | **0.632** | |
| cs13 | Taking proactive role in initiating the project. | 4 | 4 | 2 | 3 | 3 | 1 | 5 | 3 | 4 | 4 | 4 | 3 | 4 | 3 | 2 | 1 | 3 | 3 | 3 | 3 | 5 | 2 | 4 | 3 | 3 | **0.632** | |
| cs14 | Ability to obtain planning permission timeously. | 4 | 3 | 3 | 3 | 5 | 3 | 4 | 5 | 4 | 4 | 2 | 5 | 2 | 3 | 4 | 1 | 3 | 4 | 3 | 1 | 1 | 1 | 4 | 2 | 4 | **0.624** | |
| cs15 | Early involvement of other stakeholders | 5 | 4 | 3 | 3 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 3 | 4 | 4 | 5 | 5 | 3 | 5 | 4 | **0.864** | |
| cs16 | Personal attributes of the champion within the consortium. | 5 | 3 | 5 | 2 | 3 | 5 | 5 | 2 | 4 | 4 | 5 | 4 | 3 | 4 | 5 | 5 | 3 | 4 | 3 | 3 | 5 | 5 | 3 | 3 | 3 | **0.768** | |
| cs17 | Ability to persevere during protracted negotiations. | 5 | 4 | 3 | 4 | 4 | 4 | 5 | 2 | 5 | 4 | 5 | 4 | 5 | 3 | 2 | 1 | 4 | 5 | 5 | 4 | 4 | 5 | 3 | 5 | 4 | **0.792** | |
| cs18 | The multidisciplinary nature of consortium team. | 4 | 3 | 4 | 3 | 5 | 2 | 5 | 2 | 3 | 5 | 2 | 4 | 3 | 2 | 3 | 3 | 4 | 3 | 5 | 3 | 4 | 5 | 3 | 3 | 3 | **0.688** | |
| cs19 | Experience of previously working with the public sector procurer. | 4 | 2 | 1 | 4 | 2 | 1 | 5 | 1 | 3 | 4 | 2 | 4 | 1 | 3 | 1 | 1 | 2 | 3 | 5 | 3 | 4 | 5 | 4 | 1 | 2 | **0.544** | |
| | | 80 | 65 | 65 | 63 | 84 | 68 | 87 | 48 | 80 | 80 | 73 | 78 | 65 | 64 | 62 | 47 | 68 | 68 | 76 | 66 | 79 | 86 | 66 | 64 | 67 | | |
| | **Quality of Technical Proposal** | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.710** |
| ct1 | Robustness of outline technical proposal. | 4 | 4 | 3 | 3 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 1 | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 3 | 3 | **0.776** | |
| ct2 | Clarity of submissions and responses to queries | 4 | 3 | 3 | 4 | 5 | 3 | 4 | 4 | 4 | 4 | 5 | 4 | 5 | 2 | 2 | 5 | 4 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | **0.816** | |
| ct3 | Innovative technical solutions. | 3 | 3 | 3 | 3 | 5 | 3 | 3 | 4 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 3 | 3 | 4 | 4 | 5 | 5 | 3 | 2 | 4 | **0.616** | |
| ct4 | Provision of sound technical guarantee. | 4 | 3 | 1 | 2 | 4 | 2 | 4 | 3 | 4 | 3 | 3 | 2 | 4 | 1 | 1 | 2 | 4 | 5 | 4 | 3 | 5 | 5 | 3 | 4 | 3 | **0.632** | |
| | | 15 | 13 | 10 | 12 | 19 | 12 | 15 | 15 | 16 | 14 | 15 | 12 | 14 | 7 | 5 | 13 | 15 | 16 | 18 | 16 | 20 | 20 | 14 | 14 | 15 | | |
| | **Quality of the Financial Proposal** | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.656** |
| cf1 | Level of financial guarantees provided/proposed by the consortium. | 4 | 3 | 4 | 4 | 4 | 2 | 3 | 4 | 4 | 4 | 3 | 2 | 3 | 2 | 1 | 5 | 5 | 5 | 4 | 4 | 5 | 5 | 4 | 3 | 3 | **0.720** | |
| cf2 | Payment mechanisms proposed | 5 | 3 | 4 | 4 | 5 | 3 | 4 | 4 | 4 | 2 | 3 | 2 | 5 | 1 | 1 | 5 | 4 | 3 | 4 | 3 | 5 | 5 | 2 | 5 | 5 | **0.728** | |
| cf3 | Level of government funding/guarantees required by the consortium. | 4 | 3 | 4 | 3 | 5 | 4 | 4 | 3 | 4 | 3 | 4 | 2 | 5 | 1 | 1 | 3 | 4 | 3 | 4 | 2 | 3 | 5 | 3 | 5 | 4 | **0.688** | |
| cf4 | Levels of tariff/tolls proposed | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 2 | 5 | 5 | 4 | 5 | 5 | **0.864** | |
| cf5 | Credibility of financiers | 3 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 5 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 3 | 3 | 5 | **0.800** | |
| cf6 | Level of exposure of the public sector organisation to financial risks | 4 | 4 | 4 | 4 | 3 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 1 | 3 | 5 | 3 | 3 | 5 | 3 | 1 | 5 | 4 | 4 | 4 | **0.744** | |
| cf7 | Level of financial returns to the public sector organisation. | 3 | 3 | 4 | 4 | 3 | 1 | 2 | 3 | 3 | 2 | 5 | 1 | 3 | 1 | 1 | 1 | 2 | 5 | 4 | 3 | 1 | 5 | 2 | 3 | 4 | **0.552** | |
| cf8 | Length of concession period proposed. | 4 | 2 | 3 | 4 | 3 | 3 | 1 | 3 | 4 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 3 | 4 | 3 | 5 | 5 | 2 | 2 | 4 | **0.552** | |
| cf9 | Level of third party revenue to be generated. | 3 | 2 | 3 | 3 | 3 | 1 | 1 | 2 | 4 | 1 | 3 | 1 | 2 | 1 | 1 | 1 | 2 | 5 | 2 | 2 | 5 | 5 | 1 | 2 | 3 | **0.472** | |
| cf10 | High Equity/debt ratio so as to drive commitment. | 3 | 3 | 1 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 2 | 1 | 3 | 1 | 1 | 3 | 3 | 1 | 4 | 1 | 2 | 2 | 4 | **0.440** | |
| | | 37 | 31 | 35 | 37 | 37 | 30 | 26 | 33 | 38 | 27 | 35 | 26 | 34 | 17 | 19 | 30 | 33 | 40 | 40 | 28 | 39 | 46 | 27 | 34 | 41 | | |

Appendix C.1

## Split-half test for Consortium Attributes

| | | overall rating (A) *n* = 49 | | | | split1 ratings (B) *n* = 24 | | | | split 2 rating C *n* = 25 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *I sub* | *r sub* | *I main* | *r main* | *I sub* | *r sub* | *I main* | *r main* | *I sub* | *r sub* | *I main* | *r main* |
| | **Nature and Strength** | | | 0.738 | 1 | | | 0.740 | 1 | | | 0.736 | 1 |
| cs1 | Previous experience in PPP procurement. | 0.792 | 8 | | | 0.825 | 4.5 | | | 0.760 | 10 | | |
| cs2 | Reputation enjoyed by the consortium. | 0.702 | 11 | | | 0.725 | 10 | | | 0.680 | 13 | | |
| cs3 | PPP being a strategic business interest | 0.686 | 12 | | | 0.675 | 15 | | | 0.696 | 11 | | |
| cs4 | Ability to tie equity into the project for a long period | 0.682 | 13 | | | 0.708 | 12 | | | 0.656 | 14 5 | | |
| cs5 | Readiness to accept risk. | 0.816 | 6 | | | 0.817 | 6 | | | 0.816 | 6 | | |
| cs6 | Open/frank communication during the negotiations. | 0.841 | 3 | | | 0.825 | 4.5 | | | 0.856 | 3 | | |
| cs7 | Willingness to commit to earlier negotiated terms. | 0.751 | 10 | | | 0.717 | 11 | | | 0.784 | 8 | | |
| cs8 | Current job holding of consortium members | 0.604 | 18 | | | 0.550 | 19 | | | 0.656 | 14 5 | | |
| cs9 | Appointing a dedicated bid manager | 0.865 | 1 | | | 0.892 | 1 | | | 0.840 | 4 | | |
| cs10 | Understanding the public sector needs. | 0.853 | 2 | | | 0.833 | 2 5 | | | 0.872 | 1 | | |
| cs11 | Ability of consortium members to work harmoniously. | 0.820 | 5 | | | 0.808 | 7 | | | 0.832 | 5 | | |
| cs12 | Experience of previously working together as a team | 0.665 | 15 | | | 0.700 | 13 | | | 0.632 | 16 5 | | |
| cs13 | Taking proactive role in initiating the project. | 0.629 | 17 | | | 0.625 | 18 | | | 0.632 | 16 5 | | |
| cs14 | Ability to obtain planning permission timeously | 0.657 | 16 | | | 0.692 | 14 | | | 0.624 | 18 | | |
| cs15 | Early involvement of other stakeholders | 0.833 | 4 | | | 0.800 | 8 | | | 0.864 | 2 | | |
| cs16 | Personal attributes of the champion within the consortium. | 0.755 | 9 | | | 0.742 | 9 | | | 0.768 | 9 | | |
| cs17 | Ability to persevere during protracted negotiations. | 0.812 | 7 | | | 0.833 | 2 5 | | | 0.792 | 7 | | |
| cs18 | The multidisciplinary nature of consortium team. | 0.669 | 14 | | | 0.650 | 16.5 | | | 0.688 | 12 | | |
| cs19 | Experience of previously working with the public sector procurer | 0.596 | 19 | | | 0.650 | 16 5 | | | 0.544 | 19 | | |
| | **Quality of Technical Proposal** | | | 0.723 | 2 | | | 0.738 | 2 | | | 0.710 | 2 |
| ct1 | Robustness of outline technical proposal | 0.780 | 2 | | | 0.783 | 1.5 | | | 0.776 | 2 | | |
| ct2 | Clarity of submissions and responses to queries | 0.800 | 1 | | | 0.783 | 1.5 | | | 0.816 | 1 | | |
| ct3 | Innovative technical solutions. | 0.641 | 4 | | | 0.667 | 4 | | | 0.616 | 4 | | |
| ct4 | Provision of sound technical guarantee. | 0.673 | 3 | | | 0.717 | 3 | | | 0.632 | 3 | | |
| | **Quality of the Financial Proposal** | | | 0.652 | 3 | | | 0.648 | 3 | | | 0.656 | 3 |
| cf1 | Level of financial guarantees provided/proposed by the consortium. | 0.739 | 4 | | | 0.758 | 3 | | | 0.720 | 5 | | |
| cf2 | Payment mechanisms proposed | 0.731 | 5 | | | 0.733 | 4.5 | | | 0.728 | 4 | | |
| cf3 | Level of government funding/guarantees required by the consortium. | 0.641 | 6 | | | 0.592 | 6 | | | 0.688 | 6 | | |
| cf4 | Levels of tariff/tolls proposed | 0.845 | 1 | | | 0.825 | 1 | | | 0.864 | 1 | | |
| cf5 | Credibility of financiers | 0.767 | 2 | | | 0.733 | 4 5 | | | 0.800 | 2 | | |
| cf6 | Level of exposure of the public sector organisation to financial risks | 0.763 | 3 | | | 0.783 | 2 | | | 0.744 | 3 | | |
| cf7 | Level of financial returns to the public sector organisation. | 0.551 | 8 | | | 0.550 | 8 | | | 0.552 | 7.5 | | |
| cf8 | Length of concession period proposed | 0.567 | 7 | | | 0.583 | 7 | | | 0.552 | 7.5 | | |
| cf9 | Level of third party revenue to be generated | 0.453 | 10 | | | 0.433 | 10 | | | 0.472 | 9 | | |
| cf10 | High Equity/debt ratio so as to drive commitment. | 0.465 | 9 | | | 0.492 | 9 | | | 0.440 | 10 | | |

*Notes:*
- *I sub:-* relative significance index for the sub-attributes
- *r sub:-* ranking of the sub-attributs
- *I main:-* relative significance index of the main attributes
- *r main:-* ranking of the main attributes
- rho:- spearmam's rank correlation coefficient

| | rho | |
|---|---|---|
| rho between A and B for nature and strength | 0 921 | |
| rho between A and C for nature and strength | 0.954 | |
| rho between B and C for nature and strength | 0.805 | |
| ***rhocs*** $_{av}$ | | ***0.894*** |
| rho between A and B for quality of tech proposal | 0.949 | |
| rho between A and C for quality of technical proposal | 1.000 | |
| rho between B and C for quality of technical proposal | 0 949 | |
| ***rhoct*** $_{av}$ | | ***0.966*** |
| rho between A and B for quality of financial proposal | 0.948 | |
| rho between A and C for quality of financial proposal | 0.973 | |
| rho between B and C for quality of finacial proposal | 0.915 | |
| ***rhocf*** $_{av}$ | | ***0.945*** |
| ***rho*** $_{con-o'all}$ | | **0.935** |

at 0.005 (0.5%) level of significance with N=33, ***rho*** $_{critical}$ from statistical tables is **0.446**

Since 0.935 is greater than 0.446 *Ho* is rejected

For N = 33, *rho* = 0.935 from the statistical tables shows that a value as large as this is significant at $p < .001$ level (one-tail test). Thus we could reject *Ho* at $\alpha = 0.001$ level.

**Further check using Kendall's Coefficient of Concordance**

From the relationship $rhoav = \frac{kW-1}{k-1}$

where
*W* = Kendall's Coefficient of Concordance (level of agreement)
*k* = is the sets of ranking (= 3)

*Hence* $W = \frac{rhoav(k-1)+1}{k}$

W = 0.957

again $\chi 2 = k(N-1)W$

with N = 33

$\chi 2 = 91.8328$

From statistical tables we find that $\chi^2 \geq 91.8328$ with a degree of freedom, *df* = N - 1 = 32 has a probability of occurrence under *Ho* of $p < 0.001$. Hence it can be concluded with considerable assurance that the likelihood of the samples coming from the same population is higher than it will be by chance.

The very low probability under the *Ho* associated with the observed value of *W* enables us to reject the null hypothesis that the ratings for the sets are unrelated. Hence we accept the alternative hypothesis that the ratings are related.

## General Rating of Public Sector Attributes

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | Attributes | | |

# General Rating of Public Sector Attributes - Split 1

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | project ID | 19 | 15 | 13 | 12 | 3 | 2 | 1 | 32 | 28 | 27 | 23 | 14 | 9 | 8 | 6 | 5 | 11 | 7 | 36 | 26 | 24 | 16 | 10 | 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondent | pr | pr | pr | pu | pu | pr | pr | pu | pr | pu | pr | pr | pu | pu | pr | pu | pu | pu | pr | pr | pu | pu | pr | pu | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | fld | fld | w/s | rlt | w/s | rlt | | |
| | **Attributes** | | | | | | | | | | | | | | | | | | | | | | | | | **isub** | **imain** |
| | **Organisational Capabilities** | | | | | | | | | | | | | | | | | | | | | | | | | | **0.735** |
| po1 | Ability to effectively sensitise public opinion on the project. | 4 | 3 | 3 | 4 | 4 | 3 | 5 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 3 | 3 | 3 | 4 | 2 | 3 | 1 | 4 | 3 | 4 | **0.692** | |
| po2 | Level of reputation enjoyed by the organisation. | 4 | 1 | 4 | 3 | 4 | 3 | 4 | 3 | 3 | 4 | 4 | 3 | 4 | 4 | 2 | 2 | 4 | 4 | 1 | 3 | 3 | 4 | 4 | 3 | **0.650** | |
| po3 | Level of bureaucracy in the decision making process. | 3 | 5 | 5 | 2 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 3 | 3 | 3 | 3 | 2 | 5 | 5 | 4 | 4 | 2 | 4 | 4 | 4 | **0.750** | |
| po4 | Attitude to cost e.g. excessive desire to drive down cost | 2 | 3 | 4 | 2 | 3 | 3 | 4 | 4 | 3 | 5 | 5 | 4 | 4 | 3 | 2 | 3 | 5 | 5 | 3 | 4 | 3 | 4 | 2 | 4 | **0.700** | |
| po5 | Top level commitment | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 5 | 5 | 4 | 4 | 3 | 5 | 5 | 4 | **0.917** | |
| po6 | Team collaboration and commitment | 4 | 3 | 4 | 5 | 4 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 5 | 3 | 5 | 4 | 4 | 3 | 5 | 5 | 4 | **0.850** | |
| po7 | Open/frank and flexible communication during negotiations. | 5 | 5 | 3 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 3 | 5 | 3 | 4 | 3 | 4 | 3 | 4 | **0.842** | |
| po8 | Pre-established PPP Unit | 4 | 4 | 5 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 5 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 4 | 4 | 2 | 5 | 4 | **0.658** | |
| po9 | Assisting in land acquisition and in obtaining permits | 4 | 4 | 3 | 3 | 4 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | 5 | 4 | 3 | 1 | 4 | 3 | 4 | 4 | 4 | 4 | 2 | 4 | **0.692** | |
| po10 | Tapping knowledge and expertise gained elsewhere | 5 | 4 | 3 | 4 | 3 | 4 | 3 | 3 | 4 | 2 | 3 | 3 | 3 | 4 | 2 | 3 | 4 | 4 | 2 | 2 | 1 | 4 | 3 | 4 | **0.642** | |
| po11 | Commitment to earlier negotiated terms | 4 | 4 | 3 | 4 | 5 | 4 | 4 | 4 | 3 | 4 | 3 | 5 | 4 | 5 | 4 | 3 | 5 | 5 | 4 | 3 | 1 | 3 | 3 | 4 | **0.758** | |
| po12 | Ability to accept and absorb risks | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 5 | 3 | 4 | 3 | 4 | 4 | 4 | 3 | 1 | 2 | 5 | 2 | 3 | 4 | 3 | 2 | 4 | **0.675** | |
| | | 48 | 43 | 46 | 40 | 45 | 43 | 50 | 47 | 43 | 51 | 49 | 45 | 47 | 50 | 37 | 34 | 45 | 53 | 35 | 42 | 32 | 46 | 41 | 47 | | |
| | **Technical Capabilities** | | | | | | | | | | | | | | | | | | | | | | | | | | **0.726** |
| pt1 | Strong in-house expertise | 3 | 5 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 5 | 3 | 3 | 5 | 3 | 1 | 5 | 4 | 2 | 4 | 4 | 4 | 5 | 4 | **0.750** | |
| pt2 | Sound preparatory work | 4 | 3 | 3 | 4 | 4 | 3 | 4 | 4 | 4 | 2 | 4 | 4 | 3 | 5 | 3 | 3 | 5 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | **0.717** | |
| pt3 | Previous experience in PPP procurement | 4 | 4 | 3 | 5 | 2 | 5 | 4 | 3 | 4 | 3 | 4 | 3 | 3 | 2 | 4 | 1 | 3 | 4 | 2 | 3 | 3 | 3 | 4 | 4 | **0.667** | |
| pt4 | Experience in infrastructure procurement | 4 | 2 | 3 | 3 | 4 | 5 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 5 | 4 | 3 | 3 | 5 | 3 | 3 | 3 | 4 | 2 | 4 | **0.700** | |
| pt5 | Clear established evaluation criteria | 3 | 3 | 4 | 4 | 5 | 2 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 3 | 2 | 4 | 5 | 3 | 2 | 3 | 5 | 4 | 4 | **0.758** | |
| pt6 | Clear output specifications | 3 | 4 | 4 | 4 | 5 | 3 | 5 | 4 | 5 | 4 | 5 | 5 | 3 | 4 | 4 | 4 | 2 | 5 | 4 | 4 | 5 | 5 | 4 | 4 | **0.825** | |
| pt7 | The use of standard bidding documents | 4 | 4 | 5 | 2 | 1 | 5 | 3 | 4 | 4 | 4 | 5 | 3 | 3 | 3 | 3 | 2 | 3 | 5 | 2 | 2 | 3 | 3 | 3 | 4 | **0.667** | |
| | | 25 | 25 | 25 | 26 | 24 | 27 | 28 | 27 | 29 | 24 | 31 | 26 | 22 | 29 | 24 | 16 | 25 | 32 | 19 | 21 | 24 | 27 | 26 | 28 | | |
| | **Financial Capabilities** | | | | | | | | | | | | | | | | | | | | | | | | | | **0.563** |
| pf1 | Ability to raise funds through Bonds. | 2 | 1 | 3 | 1 | 2 | 4 | 4 | 3 | 3 | 2 | 4 | 3 | 1 | 1 | 2 | 1 | 4 | 4 | 1 | 1 | 1 | 4 | 1 | 4 | **0.475** | |
| pf2 | Strong financial support/guarantees from the central govt | 4 | 1 | 3 | 1 | 5 | 4 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 1 | 2 | 4 | 3 | 3 | 4 | 1 | 2 | 4 | 4 | **0.692** | |
| pf3 | Flexible tax regimes. | 2 | 1 | 3 | 2 | 1 | 4 | 4 | 3 | 4 | 2 | 4 | 3 | 1 | 1 | 1 | 1 | 3 | 3 | 1 | 1 | 1 | 2 | 1 | 4 | **0.442** | |
| pf4 | Ability to provide equity finance. | 2 | 1 | 4 | 1 | 5 | 1 | 3 | 3 | 3 | 2 | 4 | 3 | 1 | 1 | 1 | 1 | 3 | 3 | 1 | 1 | 1 | 5 | 1 | 2 | **0.442** | |
| pf5 | Capability to pay | 4 | 1 | 3 | 4 | 5 | 4 | 5 | 3 | 4 | 5 | 4 | 3 | 5 | 5 | 5 | 1 | 4 | 4 | 5 | 5 | 1 | 5 | 5 | 2 | **0.767** | |
| | | 14 | 5 | 16 | 9 | 18 | 17 | 20 | 17 | 18 | 16 | 20 | 17 | 13 | 13 | 10 | 6 | 18 | 17 | 11 | 12 | 5 | 18 | 12 | 16 | | |

# General Rating of Public Sector Attributes - Split 2

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | project ID | 50 | 49 | 40 | 38 | 33 | 31 | 29 | 48 | 47 | 46 | 45 | 42 | 41 | 39 | 35 | 34 | 21 | 17 | 44 | 37 | 30 | 22 | 20 | 18 | 43 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondent | pr | pr | pu | pu | pr | pu | pr | pr | pr | pr | pr | pu | pu | pu | pr | pu | pr | pu | pr | pu | pr | pr | pu | pu | pu | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | rdt | stl | rdt | rdt | rdt/b | rdt | rlt | | |
| | **Attributes** | | | | | | | | | | | | | | | | | | | | | | | | | | **isub** | **imain** |
| | **Organisational Capabilities** | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.737** |
| po1 | Ability to effectively sensitise public opinion on the project. | 5 | 5 | 2 | 3 | 3 | 4 | 4 | 2 | 4 | 4 | 3 | 2 | 3 | 3 | 3 | 1 | 3 | 3 | 4 | 3 | 5 | 5 | 5 | 3 | 3 | **0.680** | |
| po2 | Level of reputation enjoyed by the organisation. | 4 | 1 | 2 | 4 | 3 | 3 | 3 | 2 | 4 | 3 | 4 | 3 | 3 | 2 | 1 | 1 | 2 | 5 | 5 | 3 | 5 | 5 | 3 | 3 | 3 | **0.616** | |
| po3 | Level of bureaucracy in the decision making process. | 4 | 3 | 4 | 4 | 3 | 4 | 5 | 3 | 4 | 5 | 5 | 4 | 3 | 3 | 2 | 4 | 3 | 4 | 3 | 4 | 2 | 5 | 4 | 3 | 5 | **0.744** | |
| po4 | Attitude to cost e.g. excessive desire to drive down cost | 3 | 3 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 3 | 3 | 4 | 4 | 1 | 1 | 4 | 2 | 4 | 3 | 5 | 5 | 3 | 4 | 3 | **0.688** | |
| po5 | Top level commitment | 5 | 5 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 4 | 1 | 4 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 5 | **0.888** | |
| po6 | Team collaboration and commitment | 5 | 4 | 4 | 3 | 4 | 5 | 5 | 4 | 4 | 5 | 3 | 5 | 5 | 5 | 4 | 5 | 3 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 5 | **0.880** | |
| po7 | Open/frank and flexible communication during negotiations. | 5 | 4 | 5 | 3 | 4 | 5 | 5 | 5 | 4 | 5 | 3 | 4 | 4 | 5 | 4 | 3 | 4 | 5 | 4 | 3 | 4 | 5 | 4 | 5 | 5 | **0.856** | |
| po8 | Pre-established PPP Unit | 4 | 3 | 4 | 4 | 3 | 5 | 5 | 3 | 4 | 3 | 4 | 2 | 1 | 3 | 2 | 1 | 3 | 1 | 4 | 3 | 1 | 5 | 3 | 3 | 3 | **0.616** | |
| po9 | Assisting in land acquisition and in obtaining permits | 4 | 2 | 4 | 2 | 4 | 3 | 5 | 2 | 4 | 4 | 3 | 5 | 3 | 3 | 3 | 3 | 2 | 5 | 5 | 1 | 5 | 5 | 4 | 4 | 3 | **0.704** | |
| po10 | Tapping knowledge and expertise gained elsewhere | 4 | 3 | 3 | 4 | 4 | 2 | 5 | 2 | 4 | 4 | 2 | 1 | 2 | 2 | 4 | 3 | 3 | 3 | 5 | 4 | 5 | 5 | 4 | 4 | 4 | **0.688** | |
| po11 | Commitment to earlier negotiated terms | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 5 | 4 | 4 | 3 | 3 | 3 | 4 | 1 | 4 | 3 | 4 | 4 | 5 | 5 | 3 | 5 | 4 | **0.736** | |
| po12 | Ability to accept and absorb risks | 5 | 4 | 3 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 2 | 3 | 5 | 3 | 2 | 3 | 2 | 4 | 4 | 3 | 5 | 5 | 3 | 5 | 4 | **0.752** | |
| | | 52 | 40 | 42 | 41 | 44 | 49 | 54 | 38 | 50 | 50 | 40 | 40 | 41 | 41 | 34 | 27 | 37 | 45 | 51 | 41 | 51 | 60 | 44 | 47 | 47 | | |
| | **Technical Capabilities** | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.751** |
| pt1 | Strong in-house expertise | 5 | 5 | 2 | 4 | 5 | 1 | 5 | 3 | 4 | 2 | 3 | 4 | 5 | 4 | 3 | 5 | 1 | 4 | 5 | 5 | 5 | 5 | 3 | 5 | 3 | **0.768** | |
| pt2 | Sound preparatory work | 5 | 3 | 2 | 4 | 5 | 2 | 3 | 2 | 4 | 5 | 4 | 4 | 5 | 3 | 5 | 5 | 3 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | **0.800** | |
| pt3 | Previous experience in PPP procurement | 4 | 4 | 2 | 4 | 4 | 1 | 5 | 3 | 4 | 4 | 3 | 4 | 5 | 3 | 2 | 1 | 3 | 2 | 5 | 3 | 4 | 5 | 3 | 5 | 3 | **0.688** | |
| pt4 | Experience in infrastructure procurement | 4 | 3 | 3 | 3 | 4 | 4 | 2 | 3 | 4 | 3 | 3 | 4 | 3 | 2 | 3 | 5 | 2 | 2 | 5 | 3 | 4 | 5 | 5 | 5 | 3 | **0.696** | |
| pt5 | Clear established evaluation criteria | 4 | 3 | 3 | 4 | 5 | 3 | 3 | 3 | 4 | 4 | 5 | 4 | 3 | 3 | 3 | 3 | 3 | 5 | 5 | 4 | 4 | 5 | 4 | 3 | 5 | **0.760** | |
| pt6 | Clear output specifications | 4 | 5 | 3 | 5 | 4 | 5 | 3 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 5 | 4 | 5 | 2 | 5 | 4 | 5 | 4 | 5 | 5 | **0.832** | |
| pt7 | The use of standard bidding documents | 4 | 3 | 4 | 2 | 5 | 3 | 3 | 2 | 4 | 5 | 4 | 4 | 3 | 3 | 4 | 2 | 4 | 1 | 4 | 4 | 4 | 5 | 3 | 5 | 4 | **0.712** | |
| | | 30 | 26 | 19 | 26 | 32 | 19 | 24 | 20 | 28 | 27 | 26 | 28 | 27 | 22 | 24 | 26 | 20 | 23 | 31 | 28 | 30 | 35 | 26 | 32 | 28 | | |
| | **Financial Capabilities** | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.592** |
| pf1 | Ability to raise funds through Bonds. | 3 | 2 | 3 | 3 | 2 | 5 | 1 | 2 | 3 | 3 | 1 | 1 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 5 | 2 | 1 | 1 | 3 | 3 | **0.440** | |
| pf2 | Strong financial support/guarantees from the central govt | 4 | 3 | 3 | 4 | 4 | 5 | 4 | 4 | 5 | 3 | 4 | 5 | 5 | 3 | 5 | 5 | 3 | 1 | 5 | 5 | 4 | 5 | 4 | 4 | 3 | **0.800** | |
| pf3 | Flexible tax regimes. | 3 | 3 | 3 | 3 | 4 | 1 | 1 | 2 | 3 | 4 | 4 | 1 | 2 | 3 | 1 | 1 | 2 | 1 | 1 | 3 | 4 | 3 | 3 | 2 | 3 | **0.488** | |
| pf4 | Ability to provide equity finance. | 4 | 1 | 4 | 2 | 4 | 1 | 1 | 2 | 3 | 5 | 1 | 1 | 3 | 2 | 1 | 1 | 1 | 5 | 1 | 3 | 5 | 1 | 1 | 4 | 1 | **0.464** | |
| pf5 | Capability to pay | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 3 | 3 | 4 | 5 | 5 | 2 | 1 | 5 | 3 | 5 | 5 | 2 | 1 | 5 | 1 | 5 | 5 | **0.768** | |
| | | 19 | 13 | 17 | 16 | 19 | 17 | 12 | 14 | 17 | 18 | 14 | 13 | 18 | 13 | 9 | 13 | 10 | 13 | 13 | 18 | 16 | 15 | 10 | 18 | 15 | | |

Appendix C.1

## split half test for public sector attributes

| | | overall rating (A) *n = 49* | | | | split 1 ratings (B) *n = 25* | | | | split 2 rating C *n = 24* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *I sub* | *r sub* | *I main* | *r main* | *I sub* | *r sub* | *I main* | *r main* | *I sub* | *r sub* | *I main* | *r main* |
| | **Organisational Capabilities** | | | 0.736 | 2 | | | 0.735 | 1 | | | 0.737 | 2 |
| po1 | Ability to effectively sensitise public opinion on the project. | 0.686 | 9 | | | 0.692 | 7.5 | | | 0.680 | 10 | | |
| po2 | Level of reputation enjoyed by the organisation. | 0.633 | 12 | | | 0.650 | 11 | | | 0.616 | 11.5 | | |
| po3 | Level of buresucracy in the decision making process. | 0.747 | 4.5 | | | 0.750 | 5 | | | 0.744 | 5 | | |
| po4 | Attitude to cost e g. excessive desire to drive down cost | 0.694 | 8 | | | 0.700 | 6 | | | 0.688 | 8.5 | | |
| po5 | Top level commitment | 0.902 | 1 | | | 0.917 | 1 | | | 0.888 | 1 | | |
| po6 | Team collaboration and commitment | 0.865 | 2 | | | 0.850 | 2 | | | 0.880 | 2 | | |
| po7 | Open/frank and flexible communication during negotiations. | 0.849 | 3 | | | 0.842 | 3 | | | 0.856 | 3 | | |
| po8 | Pre-established PPP Unit | 0.637 | 11 | | | 0.658 | 10 | | | 0.616 | 11.5 | | |
| po9 | Assisting in land acquastion and in obtaining permits | 0.698 | 7 | | | 0.692 | 7.5 | | | 0.704 | 7 | | |
| po10 | Tapping knowledge and expertise gained elsewhere | 0.665 | 10 | | | 0.642 | 12 | | | 0.688 | 8 5 | | |
| po11 | Commitment to earlier negotiated terms | 0.747 | 4.5 | | | 0.758 | 4 | | | 0.736 | 6 | | |
| po12 | Ability to accept and absorb risks | 0.714 | 6 | | | 0.675 | 9 | | | 0.752 | 4 | | |
| | **Technical Capabilities** | | | 0.739 | 1 | | | 0.726 | 2 | | | 0.751 | 1 |
| pt1 | Strong in-house expertise | 0.759 | 3 | | | 0.750 | 3 | | | 0.768 | 3 | | |
| pt2 | Sound preparatory work | 0.759 | 3 | | | 0.717 | 4 | | | 0.800 | 2 | | |
| pt3 | Previous experience in PPP procurement | 0.678 | 7 | | | 0.667 | 6 5 | | | 0.688 | 7 | | |
| pt4 | Experience in infrastructure procurement | 0.698 | 5 | | | 0.700 | 5 | | | 0.696 | 6 | | |
| pt5 | Clear established evaluation criteria | 0.759 | 3 | | | 0.758 | 2 | | | 0.760 | 4 | | |
| pt6 | Clear output specifications | 0.829 | 1 | | | 0.825 | 1 | | | 0.832 | 1 | | |
| pt7 | The use of standard bidding documents | 0.690 | 6 | | | 0.667 | 6 5 | | | 0.712 | 5 | | |
| | **Financial Capabilities** | | | 0.578 | 3 | | | 0.563 | 3 | | | 0.592 | 3 |
| pf1 | Ability to raise funds through Bonds. | 0.457 | 4 | | | 0.475 | 3 | | | 0.440 | 5 | | |
| pf2 | Strong financial support/guarantees from the central govt | 0.747 | 2 | | | 0.692 | 2 | | | 0.800 | 1 | | |
| pf3 | Flexible tax regimes. | 0.465 | 3 | | | 0.442 | 4.5 | | | 0.488 | 3 | | |
| pf4 | Ability to provide equity finance. | 0.453 | 5 | | | 0.442 | 4.5 | | | 0.464 | 4 | | |
| pf5 | Capability to pay | 0.767 | 1 | | | 0.767 | 1 | | | 0.768 | 2 | | |

| | *rho* | |
|---|---|---|
| rho between A and B for nature and strength | 0.923 | |
| rho between A and C for nature and strength | 0.963 | |
| rho between B and C for nature and strength | 0.801 | |
| ***rhopo*** $_{av}$ | | ***0.896*** |
| rho between A and B for quality of tech proposal | 0 954 | |
| rho between A and C for quality of technical proposal | 0.927 | |
| rho between B and C for quality of technical proposal | 0.793 | |
| ***rhopt*** $_{av}$ | | ***0.891*** |
| rho between A and B for quality of financial proposal | 0.821 | |
| rho between A and C for quality of financial proposal | 0.800 | |
| rho between B and C for quality of finacial proposal | 0 564 | |
| ***rhopf*** $_{av}$ | | ***0.728*** |
| ***rho*** $_{av'all}$ | | **0.838** |

*Notes:*
- *I sub:-* relative significance index for the sub-attributes
- *r sub:-* ranking of the sub-attributs
- *I main:-* relative significance index of the main attributes
- *r main:-* ranking of the main attributes
- rho - spearmam's rank correlation coefficient

at 0.005 (5%) level of significance with N=24, *rho* critical from statistical tables is 0.521

since 0.838 is greater than 0.521 *Ho* is rejected

$p < 0.001$

For N = 24, *rhoav* = 0.838 from the statistical tables shows that a value as large as this is significant at $p < 0.001$ level (one-tail test). Thus we could reject *Ho* at $\alpha = 0.001$ level.

**Further check using Kendall's Coefficient of Concordance**

From the relationship $rhoav = \frac{kW-1}{k-1}$

where
*W* = Kendall Coefficient of Concordance (level of agreement)
*k* = is the sets of ranking (= 3)

*Hence* $W = \frac{rhoav(k-1)+1}{k}$

W = *0.892*

again $\chi 2 = k(N-1)W$

with N = 24

$\chi 2 =$ 61.565

From statistical tables we find that $\chi\ 2 \geq$ 61.565 with a degree of freedom, *df* = N - 1 = 23 has a probability of occurrence under *Ho* of $p < 0.001$. Hence it can be concluded with considerable assurance that the likelihood of the samples coming from the same population is higher than it will be by chance.

The very low probability under the *Ho* associated with the observed value of *W* enables us to reject the null hypothesis that the ratings for the sets are unrelated. Hence we accept the alternative hypothesis that the ratings are related.

## General Rating of project Attributes

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | project ID | 50 | 49 | 40 | 38 | 33 | 31 | 29 | 19 | 15 | 13 | 12 | 3 | 2 | 1 | 48 | 47 | 46 | 45 | 42 | 41 | 39 | 35 | 34 | 32 | 28 | 27 | 23 | 14 | 9 | 8 | 6 | 5 | 21 | 17 | 11 | 7 | 44 | 37 | 30 | 22 | 20 | 18 | 43 | 36 | 26 | 24 | 16 | 10 | 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondent | pr | pr | pu | pu | pr | pu | pr | pr | pr | pr | pu | pu | pr | pr | pr | pr | pr | pr | pu | pu | pu | pr | pu | pu | pr | pu | pr | pr | pu | pu | pr | pu | pr | pu | pu | pu | pr | pu | pr | pr | pu | pu | pr | pr | pu | pu | pr | pu | | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | off | off | rdt | stl | rdt | rdt | rdt/b | rdt | rlt | fld | fld | w/s | rlt | w/s | rlt | | |
| | **Attributes** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **isub** | **imain** |
| | **Nature of Project** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.665** |
| pn1 | Size and complexity | 4 | 2 | 4 | 4 | 3 | 5 | 5 | 3 | 5 | 5 | 4 | 4 | 4 | 4 | 2 | 3 | 5 | 4 | 4 | 5 | 4 | 5 | 5 | 3 | 2 | 5 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 5 | 4 | 5 | 4 | 4 | 5 | 5 | 2 | 4 | 4 | 5 | 3 | 5 | 3 | 5 | 3 | | **0.788** |
| pn2 | Amenability to innovation. | 3 | 2 | 3 | 3 | 5 | 2 | 3 | 4 | 1 | 3 | 4 | 3 | 1 | 3 | 3 | 3 | 4 | 3 | 2 | 3 | 3 | 2 | 1 | 3 | 3 | 2 | 5 | 3 | 3 | 4 | 4 | 3 | 2 | 5 | 2 | 5 | 3 | 3 | 5 | 5 | 3 | 4 | 4 | 4 | 4 | 1 | 3 | 3 | 3 | | **0.624** |
| pn3 | Project risk management | 5 | 3 | 4 | 3 | 4 | 4 | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 2 | 4 | 4 | 3 | 4 | 3 | 5 | 3 | 3 | 5 | 5 | 3 | 4 | 4 | 4 | 4 | 5 | 3 | 5 | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 3 | 4 | 3 | 3 | 3 | 3 | | **0.759** |
| pn4 | Impact of project on the environment. | 4 | 4 | 3 | 2 | 4 | 1 | 3 | 4 | 4 | 3 | 2 | 3 | 2 | 4 | 3 | 2 | 4 | 2 | 3 | 3 | 4 | 1 | 5 | 3 | 4 | 4 | 5 | 3 | 3 | 4 | 3 | 2 | 3 | 3 | 1 | 5 | 3 | 2 | 5 | 5 | 4 | 4 | 4 | 2 | 5 | 1 | 3 | 1 | 3 | | **0.633** |
| pn5 | Need for a third party to improve existing infrastructure. | 4 | 3 | 3 | 4 | 3 | 1 | 3 | 5 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 4 | 2 | 3 | 4 | 4 | 1 | 1 | 3 | 3 | 5 | 3 | 2 | 5 | 4 | 3 | 3 | 2 | 1 | 2 | 3 | 2 | 3 | 4 | 5 | 1 | 5 | 3 | 1 | 1 | 2 | 3 | 2 | 3 | | **0.563** |
| pn6 | Health and safety provoked by the project's development. | 4 | 3 | 3 | 2 | 3 | 4 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 4 | 2 | 3 | 4 | 2 | 3 | 3 | 2 | 1 | 5 | 3 | 3 | 3 | 4 | 3 | 4 | 4 | 4 | 3 | 3 | 1 | 2 | 3 | 4 | 2 | 3 | 5 | 5 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | | **0.584** |
| pn7 | Level of design completion required at tender. | 4 | 2 | 3 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 3 | 4 | 4 | 4 | 3 | 5 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 4 | 2 | 4 | 3 | 3 | 4 | 2 | 2 | 2 | 2 | 5 | 2 | 3 | 5 | 5 | 3 | 4 | 3 | 3 | 3 | 3 | 2 | 3 | | **0.702** |
| pn8 | Ability of project to respond to future changes. | 3 | 3 | 3 | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 3 | 5 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 3 | 5 | 5 | 3 | 3 | 4 | 3 | 3 | 3 | 5 | 4 | 5 | 2 | 3 | 5 | 5 | 2 | 5 | 4 | 3 | 4 | 2 | 4 | 5 | 2 | | **0.759** |
| pn9 | Project location and site conditions. | 3 | 2 | 3 | 2 | 3 | 5 | 3 | 3 | 4 | 4 | 3 | 4 | 4 | 3 | 4 | 2 | 5 | 3 | 3 | 4 | 4 | 4 | 5 | 3 | 4 | 4 | 3 | 3 | 5 | 3 | 4 | 4 | 3 | 5 | 5 | 3 | 2 | 3 | 5 | 5 | 3 | 4 | 4 | 1 | 5 | 1 | 3 | 2 | 3 | | **0.694** |
| pn10 | Uniqueness of project. | 3 | 2 | 4 | 2 | 4 | 4 | 3 | 4 | 3 | 4 | 2 | 2 | 4 | 3 | 5 | 2 | 2 | 2 | 1 | 5 | 4 | 1 | 2 | 3 | 4 | 3 | 4 | 3 | 3 | 3 | 4 | 3 | 3 | 1 | 5 | 5 | 2 | 5 | 5 | 5 | 2 | 2 | 3 | 1 | 5 | 1 | 2 | 5 | 3 | | **0.624** |
| pn11 | Effect on existing public sector staff | 4 | 4 | 3 | 4 | 4 | 5 | 1 | 5 | 3 | 3 | 2 | 2 | 3 | 4 | 3 | 2 | 3 | 2 | 3 | 1 | 4 | 4 | 2 | 4 | 5 | 3 | 3 | 2 | 2 | 1 | 4 | 1 | 1 | 1 | 1 | 3 | 5 | 2 | 5 | 5 | 3 | 3 | 4 | 2 | 2 | 2 | 2 | 1 | 3 | | **0.584** |
| | | 41 | 30 | 36 | 35 | 43 | 39 | 35 | 43 | 36 | 42 | 33 | 34 | 31 | 41 | 36 | 29 | 44 | 29 | 33 | 40 | 39 | 31 | 36 | 37 | 38 | 40 | 45 | 32 | 38 | 38 | 39 | 33 | 27 | 35 | 34 | 50 | 27 | 38 | 54 | 53 | 31 | 43 | 41 | 27 | 38 | 24 | 31 | 32 | 31 | | |
| | **Marketability of Project** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.656** |
| pm1 | Suitability for private participation. | 4 | 4 | 5 | 4 | 5 | 3 | 3 | 5 | 3 | 4 | 4 | 5 | 5 | 5 | 3 | 4 | 5 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 3 | 4 | 4 | 5 | 4 | 4 | 5 | 2 | 4 | 5 | 2 | 5 | 5 | 5 | 5 | 5 | 3 | 4 | 5 | 4 | 3 | 4 | 3 | 5 | 3 | | **0.824** |
| pm2 | Level to which project must meet general public needs. | 4 | 2 | 5 | 4 | 3 | 5 | 2 | 5 | 1 | 4 | 4 | 5 | 3 | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 3 | 1 | 5 | 4 | 3 | 5 | 5 | 3 | 5 | 5 | 3 | 4 | 3 | 4 | 2 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 4 | 1 | 3 | | **0.755** |
| pm3 | Possible land and property deals and buyouts. | 3 | 4 | 4 | 3 | 4 | 2 | 5 | 4 | 2 | 3 | 2 | 1 | 2 | 3 | 2 | 2 | 4 | 3 | 3 | 4 | 3 | 4 | 2 | 4 | 3 | 2 | 3 | 3 | 4 | 4 | 3 | 3 | 2 | 5 | 5 | 5 | 4 | 4 | 5 | 3 | 5 | 3 | 3 | 3 | 1 | 1 | 2 | 4 | 3 | | **0.637** |
| pm4 | Useful life at the end of concession period | 4 | 2 | 5 | 4 | 3 | 1 | 1 | 4 | 2 | 3 | 3 | 4 | 1 | 4 | 3 | 3 | 5 | 3 | 3 | 4 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 2 | 3 | 5 | 3 | 3 | 2 | 2 | 5 | 5 | 4 | 5 | 1 | 5 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 4 | 3 | | **0.661** |
| pm5 | Bankability of project | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 1 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 4 | 1 | 4 | 5 | 4 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 1 | 5 | 5 | 5 | 3 | | **0.890** |
| pm6 | Monopolistic advantage | 4 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 4 | 3 | 2 | 1 | 2 | 4 | 2 | 3 | 4 | 3 | 3 | 3 | 3 | 1 | 1 | 3 | 4 | 1 | 3 | 3 | 3 | 2 | 3 | 1 | 1 | 1 | 3 | 3 | 2 | 4 | 5 | 5 | 2 | 3 | 3 | 3 | 3 | 4 | 2 | 2 | 3 | | **0.539** |
| pm7 | Ability of project to generate third party revenue | 3 | 2 | 4 | 3 | 3 | 1 | 1 | 3 | 2 | 3 | 2 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 1 | 3 | 3 | 1 | 1 | 3 | 3 | 2 | 3 | 2 | 2 | 1 | 2 | 1 | 1 | 5 | 2 | 3 | 2 | 2 | 5 | 3 | 1 | 3 | 2 | 1 | 1 | 1 | 3 | 2 | 3 | | **0.453** |
| pm8 | Opportunities for future refinancing | 4 | 3 | 4 | 3 | 3 | 2 | 1 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 4 | 5 | 3 | 3 | 3 | 3 | 1 | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 4 | 3 | 2 | 3 | 5 | 3 | 3 | 3 | 3 | 5 | 3 | 1 | 3 | 3 | 2 | 3 | 1 | 2 | 4 | 3 | | **0.584** |
| pm9 | Potential for property development rights | 3 | 3 | 4 | 4 | 3 | 1 | 1 | 3 | 2 | 3 | 3 | 1 | 2 | 2 | 2 | 3 | 5 | 4 | 1 | 2 | 2 | 3 | 1 | 2 | 3 | 1 | 3 | 2 | 1 | 3 | 2 | 1 | 2 | 5 | 5 | 3 | 3 | 1 | 5 | 3 | 1 | 4 | 2 | 1 | 1 | 1 | 2 | 3 | 3 | | **0.494** |
| pm10 | Level of tariffs and tolls. | 4 | 3 | 4 | 4 | 3 | 5 | 3 | 2 | 4 | 3 | 4 | 5 | 5 | 4 | 2 | 3 | 4 | 4 | 5 | 5 | 2 | 1 | 5 | 3 | 2 | 5 | 3 | 2 | 4 | 4 | 5 | 1 | 3 | 4 | 3 | 5 | 5 | 1 | 5 | 5 | 5 | 3 | 4 | 5 | 2 | 3 | 4 | 4 | 3 | | **0.722** |
| | | 38 | 30 | 43 | 35 | 34 | 28 | 25 | 36 | 27 | 34 | 31 | 30 | 29 | 35 | 23 | 33 | 43 | 35 | 32 | 37 | 29 | 24 | 31 | 36 | 32 | 31 | 36 | 29 | 29 | 36 | 34 | 22 | 25 | 41 | 34 | 42 | 38 | 33 | 46 | 42 | 30 | 36 | 36 | 31 | 23 | 28 | 31 | 34 | 30 | | |

***Notes***

$$(i_{sub}) = \sum_{i=1}^{n} r/(r^* \times n)$$

$$(i_{main}) = \sum_{i=1}^{n} r/(r^* \times n \times N)$$

where $(i_{sub})$ = the relative significance index for the sub-attributes;
$(i_{main})$ = the relative significance index for the main attributes;
r = the degree of significance assigned by each respondent to the *i* th attribute;
$r^*$ = the ideal or anchor score i.e. highest score (5 in this case
n = the number of responses;
N = the total number of sub-attributes under each main attribute.

pr = private
pu = public
hlth = health
sch = school
off = offices
rdt = road transport
fld = flood defence
w/s = water and sewerage
rlt = rail transport

# General rating of Project Attributes - Split 1

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | project ID | 19 | 15 | 13 | 12 | 3 | 2 | 1 | 32 | 28 | 27 | 23 | 14 | 9 | 8 | 6 | 5 | 11 | 7 | 36 | 26 | 24 | 16 | 10 | 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondent | pr | pr | pr | pu | pu | pr | pr | pu | pr | pu | pr | pr | pu | pu | pr | pu | pu | pu | pr | pr | pu | pu | pr | pu | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | fld | fld | w/s | rlt | w/s | rlt | | |
| | **Attributes** | | | | | | | | | | | | | | | | | | | | | | | | | **isub** | **imain** |
| | **Nature of Project** | | | | | | | | | | | | | | | | | | | | | | | | | | **0.657** |
| pn1 | Size and complexity | 3 | 5 | 5 | 4 | 4 | 4 | 4 | 3 | 2 | 5 | 4 | 3 | 3 | 4 | 4 | 3 | 4 | 5 | 5 | 3 | 5 | 3 | 5 | 3 | **0.775** | |
| pn2 | Amenability to innovation. | 4 | 1 | 3 | 4 | 3 | 1 | 3 | 3 | 3 | 2 | 5 | 3 | 3 | 4 | 4 | 3 | 2 | 5 | 4 | 4 | 1 | 3 | 3 | 3 | **0.617** | |
| pn3 | Project risk management | 3 | 3 | 5 | 3 | 3 | 3 | 4 | 5 | 3 | 3 | 5 | 5 | 3 | 4 | 4 | 4 | 3 | 5 | 3 | 4 | 3 | 3 | 3 | 3 | **0.725** | |
| pn4 | Impact of project on the environment. | 4 | 4 | 3 | 2 | 3 | 2 | 4 | 3 | 4 | 4 | 5 | 3 | 3 | 4 | 3 | 2 | 1 | 5 | 2 | 5 | 1 | 3 | 1 | 3 | **0.617** | |
| pn5 | Need for a third party to improve existing infrastructure. | 5 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 5 | 3 | 2 | 5 | 4 | 3 | 3 | 2 | 3 | 1 | 1 | 2 | 3 | 2 | 3 | **0.558** | |
| pn6 | Health and safety provoked by the project's development. | 3 | 2 | 3 | 2 | 2 | 2 | 4 | 3 | 3 | 3 | 4 | 3 | 4 | 4 | 3 | 3 | 3 | 4 | 2 | 2 | 3 | 3 | 2 | 3 | **0.583** | |
| pn7 | Level of design completion required at tender. | 4 | 4 | 4 | 5 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 2 | 4 | 3 | 3 | 4 | 2 | 5 | 3 | 3 | 3 | 2 | 3 | 2 | **0.675** | |
| pn8 | Ability of project to respond to future changes. | 5 | 5 | 5 | 4 | 5 | 3 | 5 | 4 | 3 | 5 | 5 | 3 | 3 | 4 | 3 | 3 | 4 | 5 | 3 | 4 | 2 | 4 | 5 | 2 | **0.783** | |
| pn9 | Project location and site conditions. | 3 | 4 | 4 | 3 | 4 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 5 | 3 | 4 | 4 | 5 | 3 | 1 | 5 | 1 | 3 | 2 | 3 | **0.675** | |
| pn10 | Uniqueness of project. | 4 | 3 | 4 | 2 | 2 | 4 | 3 | 3 | 4 | 3 | 4 | 3 | 3 | 3 | 4 | 3 | 5 | 5 | 1 | 5 | 1 | 2 | 5 | 3 | **0.658** | |
| pn11 | Effect on existing public sector staff | 5 | 3 | 3 | 2 | 2 | 3 | 4 | 4 | 5 | 3 | 3 | 2 | 2 | 1 | 4 | 1 | 3 | 5 | 2 | 2 | 2 | 2 | 1 | 3 | **0.558** | |
| | | 43 | 36 | 42 | 33 | 34 | 31 | 41 | 37 | 38 | 40 | 45 | 32 | 38 | 38 | 39 | 33 | 34 | 50 | 27 | 38 | 24 | 31 | 32 | 31 | | |
| | **Marketability of Project** | | | | | | | | | | | | | | | | | | | | | | | | | | **0.633** |
| pm1 | Suitability for private participation. | 5 | 3 | 4 | 4 | 5 | 5 | 5 | 4 | 3 | 4 | 4 | 5 | 4 | 4 | 5 | 2 | 2 | 5 | 4 | 3 | 4 | 3 | 5 | 3 | **0.792** | |
| pm2 | Level to which project must meet general public needs. | 5 | 1 | 4 | 4 | 5 | 3 | 4 | 4 | 3 | 5 | 5 | 3 | 5 | 5 | 3 | 4 | 2 | 5 | 4 | 4 | 5 | 4 | 1 | 3 | **0.758** | |
| pm3 | Possible land and property deals and buyouts. | 4 | 2 | 3 | 2 | 1 | 2 | 3 | 4 | 3 | 2 | 3 | 3 | 4 | 4 | 3 | 3 | 5 | 5 | 3 | 1 | 1 | 2 | 4 | 3 | **0.583** | |
| pm4 | Useful life at the end of concession period. | 4 | 2 | 3 | 3 | 4 | 1 | 4 | 4 | 4 | 4 | 4 | 2 | 3 | 5 | 3 | 3 | 5 | 5 | 3 | 4 | 3 | 4 | 4 | 3 | **0.700** | |
| pm5 | Bankability of project | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 4 | 1 | 4 | 5 | 4 | 4 | 5 | 5 | 1 | 5 | 5 | 5 | 3 | **0.850** | |
| pm6 | Monopolistic advantage | 2 | 4 | 3 | 2 | 1 | 2 | 4 | 3 | 4 | 1 | 3 | 3 | 3 | 2 | 3 | 1 | 3 | 3 | 3 | 3 | 4 | 2 | 2 | 3 | **0.533** | |
| pm7 | Ability of project to generate third party revenue. | 3 | 2 | 3 | 2 | 1 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 1 | 2 | 1 | 2 | 3 | 1 | 1 | 1 | 3 | 2 | 3 | **0.417** | |
| pm8 | Opportunities for future refinancing | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 4 | 3 | 3 | 3 | 3 | 2 | 4 | 3 | 2 | 3 | 3 | 2 | 3 | 1 | 2 | 4 | 3 | **0.550** | |
| pm9 | Potential for property development rights | 3 | 2 | 3 | 3 | 1 | 2 | 2 | 2 | 3 | 1 | 3 | 2 | 1 | 3 | 2 | 1 | 5 | 3 | 1 | 1 | 1 | 2 | 3 | 3 | **0.442** | |
| pm10 | Level of tariffs and tolls. | 2 | 4 | 3 | 4 | 5 | 5 | 4 | 3 | 2 | 5 | 3 | 2 | 4 | 4 | 5 | 1 | 3 | 5 | 5 | 2 | 3 | 4 | 4 | 3 | **0.708** | |
| | | 36 | 27 | 34 | 31 | 30 | 29 | 35 | 36 | 32 | 31 | 36 | 29 | 29 | 36 | 34 | 22 | 34 | 42 | 31 | 23 | 28 | 31 | 34 | 30 | | |

# General rating of Project Attributes - Spit 2

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | project ID | 50 | 49 | 40 | 38 | 33 | 31 | 29 | 48 | 47 | 46 | 45 | 42 | 41 | 39 | 35 | 34 | 21 | 7 | 44 | 37 | 30 | 22 | 20 | 18 | 43 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondent | pr | pr | pu | pu | pr | pu | pr | pr | pr | pr | pr | pu | pu | pu | pr | pu | pr | pu | pr | pu | pr | pr | pu | pu | pu | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | rdt | stl | rdt | rdt | rdt/b | rdt | rlt | | |
| | **Attributes** | | | | | | | | | | | | | | | | | | | | | | | | | | **isub** | **imain** |
| | **Nature of Project** | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.684** |
| pn1 | Size and complexity | 4 | 2 | 4 | 4 | 3 | 5 | 5 | 2 | 3 | 5 | 4 | 4 | 5 | 4 | 5 | 5 | 3 | 5 | 4 | 4 | 5 | 5 | 2 | 4 | 4 | **0.800** | |
| pn2 | Amenability to innovation. | 3 | 2 | 3 | 3 | 5 | 2 | 3 | 3 | 3 | 4 | 3 | 2 | 3 | 3 | 2 | 1 | 2 | 5 | 3 | 3 | 5 | 5 | 3 | 4 | 4 | **0.632** | |
| pn3 | Project risk management | 5 | 3 | 4 | 3 | 4 | 4 | 3 | 4 | 4 | 4 | 2 | 4 | 4 | 3 | 4 | 3 | 4 | 5 | 3 | 4 | 5 | 5 | 5 | 5 | 5 | **0.792** | |
| pn4 | Impact of project on the environment. | 4 | 4 | 3 | 2 | 4 | 1 | 3 | 3 | 2 | 4 | 2 | 3 | 3 | 4 | 1 | 5 | 3 | 5 | 3 | 2 | 5 | 5 | 4 | 4 | 4 | **0.664** | |
| pn5 | Need for a third party to improve existing infrastructure. | 4 | 3 | 3 | 4 | 3 | 1 | 3 | 3 | 2 | 4 | 2 | 3 | 4 | 4 | 1 | 1 | 2 | 3 | 2 | 3 | 4 | 5 | 1 | 5 | 3 | **0.584** | |
| pn6 | Health and safety provoked by the project's development. | 4 | 3 | 3 | 2 | 3 | 4 | 2 | 2 | 3 | 4 | 2 | 3 | 3 | 2 | 1 | 5 | 1 | 4 | 2 | 3 | 5 | 5 | 3 | 3 | 3 | **0.600** | |
| pn7 | Level of design completion required at tender. | 4 | 2 | 3 | 5 | 5 | 4 | 5 | 4 | 3 | 5 | 3 | 3 | 4 | 4 | 4 | 4 | 2 | 5 | 2 | 3 | 5 | 5 | 3 | 4 | 3 | **0.752** | |
| pn8 | Ability of project to respond to future changes. | 3 | 3 | 3 | 4 | 5 | 4 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 3 | 5 | 2 | 3 | 5 | 5 | 2 | 5 | 4 | **0.736** | |
| pn9 | Project location and site conditions. | 3 | 2 | 3 | 2 | 3 | 5 | 3 | 4 | 2 | 5 | 3 | 3 | 4 | 4 | 4 | 5 | 3 | 3 | 2 | 3 | 5 | 5 | 3 | 4 | 4 | **0.696** | |
| pn10 | Uniqueness of project. | 3 | 2 | 4 | 2 | 4 | 4 | 3 | 5 | 2 | 2 | 2 | 1 | 5 | 4 | 1 | 2 | 3 | 5 | 2 | 5 | 5 | 5 | 2 | 2 | 3 | **0.624** | |
| pn11 | Effect on existing public sector staff | 4 | 4 | 3 | 4 | 4 | 5 | 1 | 3 | 2 | 3 | 2 | 3 | 1 | 4 | 4 | 2 | 1 | 5 | 2 | 5 | 5 | 3 | 3 | 3 | 4 | **0.640** | |
| | | 41 | 30 | 36 | 35 | 43 | 39 | 35 | 36 | 29 | 44 | 29 | 33 | 40 | 39 | 31 | 36 | 27 | 50 | 27 | 38 | 54 | 53 | 31 | 43 | 41 | | |
| | **Marketability of Project** | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.678** |
| pm1 | Suitability for private participation. | 4 | 4 | 5 | 4 | 5 | 3 | 3 | 3 | 4 | 5 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 3 | 4 | 5 | **0.856** | |
| pm2 | Level to which project must meet general public needs. | 4 | 2 | 5 | 4 | 3 | 5 | 2 | 4 | 3 | 3 | 3 | 4 | 4 | 3 | 1 | 5 | 3 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | **0.760** | |
| pm3 | Possible land and property deals and buyouts. | 3 | 4 | 4 | 3 | 4 | 2 | 5 | 2 | 2 | 4 | 3 | 3 | 4 | 3 | 4 | 2 | 2 | 5 | 4 | 4 | 5 | 3 | 5 | 3 | 3 | **0.688** | |
| pm4 | Useful life at the end of concession period. | 4 | 2 | 5 | 4 | 3 | 1 | 1 | 3 | 3 | 5 | 3 | 3 | 4 | 2 | 2 | 2 | 2 | 5 | 4 | 5 | 1 | 5 | 4 | 4 | 4 | **0.648** | |
| pm5 | Bankability of project | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 1 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | **0.928** | |
| pm6 | Monopolistic advantage | 4 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 4 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 3 | 2 | 4 | 5 | 5 | 2 | 3 | 3 | **0.560** | |
| pm7 | Ability of project to generate third party revenue. | 3 | 2 | 4 | 3 | 3 | 1 | 1 | 2 | 3 | 3 | 3 | 1 | 3 | 3 | 1 | 1 | 1 | 3 | 2 | 2 | 5 | 3 | 1 | 3 | 2 | **0.472** | |
| pm8 | Opportunities for future refinancing | 4 | 3 | 4 | 3 | 3 | 2 | 1 | 2 | 4 | 5 | 3 | 3 | 3 | 3 | 1 | 4 | 3 | 3 | 3 | 3 | 5 | 3 | 1 | 3 | 3 | **0.600** | |
| pm9 | Potential for property development rights | 3 | 3 | 4 | 4 | 3 | 1 | 1 | 2 | 3 | 5 | 4 | 1 | 2 | 2 | 3 | 1 | 2 | 3 | 3 | 1 | 5 | 3 | 1 | 4 | 2 | **0.528** | |
| pm10 | Level of tariffs and tolls. | 4 | 3 | 4 | 4 | 3 | 5 | 3 | 2 | 3 | 4 | 4 | 5 | 5 | 2 | 1 | 5 | 3 | 5 | 5 | 1 | 5 | 5 | 5 | 3 | 4 | **0.744** | |
| | | 38 | 30 | 43 | 35 | 34 | 28 | 25 | 23 | 33 | 43 | 35 | 32 | 37 | 29 | 24 | 31 | 25 | 42 | 38 | 33 | 46 | 42 | 30 | 36 | 36 | | |

## Split half test - Project Attributes

| | Attributes | overall rating (A) *n* = 49 | | | | split 1 ratings (B) *n* = 24 | | | | split 2 rating C *n* = 25 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *I sub* | *r sub* | *I main* | *r main* | *I sub* | *r sub* | *I main* | *r main* | *I sub* | *r sub* | *I main* | *r main* |
| | **Nature of Project** | | | 0.665 | 1 | | | 0.657 | 1 | | | 0.684 | 1 |
| pn1 | Size and complexity | 0.788 | 1 | | | 0.775 | 2 | | | 0.800 | 1 | | |
| pn2 | Amenability to innovation. | 0.624 | 7.5 | | | 0.617 | 7.5 | | | 0.632 | 8 | | |
| pn3 | Project risk management | 0.759 | 2.5 | | | 0.725 | 3 | | | 0.792 | 2 | | |
| pn4 | Impact of project on the environment. | 0.633 | 6 | | | 0.617 | 7.5 | | | 0.664 | 6 | | |
| pn5 | Need for a third party to improve existing infrastructure. | 0.563 | 11 | | | 0.558 | 10.5 | | | 0.584 | 11 | | |
| pn6 | Health and safety provoked by the project's development. | 0.584 | 9.5 | | | 0.583 | 9 | | | 0.600 | 10 | | |
| pn7 | Level of design completion required at tender. | 0.702 | 4 | | | 0.675 | 4 5 | | | 0.752 | 3 | | |
| pn8 | Ability of project to respond to future changes. | 0.759 | 2.5 | | | 0.783 | 1 | | | 0.736 | 4 | | |
| pn9 | Project location and site conditions. | 0.694 | 5 | | | 0.675 | 4 5 | | | 0.696 | 5 | | |
| pn10 | Uniqueness of project. | 0.624 | 7.5 | | | 0.658 | 6 | | | 0.624 | 9 | | |
| pn11 | Effect on existing public sector staff | 0.584 | 9 5 | | | 0.558 | 10.5 | | | 0.640 | 7 | | |
| | **Marketability of Project** | | | 0.656 | 2 | | | 0.633 | 2 | | | 0.678 | 2 |
| pm1 | Suitability for private participation. | 0.824 | 2 | | | 0.792 | 2 | | | 0.856 | 2 | | |
| pm2 | Level to which project must meet general public needs. | 0.755 | 3 | | | 0.758 | 3 | | | 0.760 | 3 | | |
| pm3 | Possible land and property deals and buyouts. | 0.637 | 6 | | | 0.583 | 6 | | | 0.688 | 5 | | |
| pm4 | Useful life at the end of concession period. | 0.661 | 5 | | | 0.700 | 5 | | | 0.648 | 6 | | |
| pm5 | Bankability of project | 0.890 | 1 | | | 0.850 | 1 | | | 0.928 | 1 | | |
| pm6 | Monopolistic advantage | 0.539 | 8 | | | 0.533 | 8 | | | 0.560 | 8 | | |
| pm7 | Ability of project to generate third party revenue. | 0.453 | 10 | | | 0.417 | 10 | | | 0.472 | 10 | | |
| pm8 | Opportunities for future refinancing | 0.584 | 7 | | | 0.550 | 7 | | | 0.600 | 7 | | |
| pm9 | Potential for property development rights | 0.494 | 9 | | | 0.442 | 9 | | | 0.528 | 9 | | |
| pm10 | Level of tariffs and tolls. | 0.722 | 4 | | | 0.708 | 4 | | | 0.744 | 4 | | |

| | rho | |
|---|---|---|
| rho between A and B for project nature | 0.954 | |
| rho between A and C for project nature | 0.943 | |
| rho between B and C for project nature | 0.824 | |
| *rhopn* av | | *0.907* |
| rho between A and B for marketability | 1.000 | |
| rho between A and C for marketability | 0 988 | |
| rho between B and C for marketability | 0.988 | |
| *rhopm* av | | *0.992* |
| *rho* av-o'all | | 0.949 |

*Notes:*
- *I sub:-* relative significance index for the sub-attributes
- *r sub:-* ranking of the sub-attributs
- *I main:-* relative significance index of the main attributes
- *r main:-* ranking of the main attributes
- rho:- spearmam's rank correlation coefficient

at 0.005 level of significance with N=21, rhocritical from statistical tables is 0.556
since 0.949 is greater than 0.610 *Ho* is rejected

$p < 0.001$

For N = 21, *rhoav* = 0.949 from the statistical tables shows that a value as large as this is significant at $p < 0.001$ level (one-tail test). Thus we could reject *Ho* at $\alpha = 0.001$ level.

### Further check using Kendall's Coefficient of Concordance

From the relationship $rhoav = \frac{kW-1}{k-1}$

where
*W* = Kendall Coefficient of Concordance (level of agreement)
*k* = is the sets of ranking (= 3)

*Hence* $W = \frac{rhoav(k-1)+1}{k}$

W = *0.966*

again $\chi 2 = k(N-1)W$

with N = 21

$\chi 2 =$ 57.98

From statistical tables we find that $\chi^2 \geq$ 57.98 with a degree of freedom, *df* = N - 1 = 20 has a probability of occurrence under *Ho* of $p < 0.001$. Hence it can be concluded with considerable assurance that the likelihood of the samples coming from the same population is higher than it will be by chance.

The very low probability under the *Ho* associated with the observed value of *W* enables us to reject the null hypothesis that the ratings for the sets are unrelated. Hence we accept the alternative hypothesis that the ratings are related.

## General Rating of External Environment Attributes

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | project ID | 50 | 49 | 40 | 38 | 33 | 31 | 29 | 19 | 15 | 13 | 12 | 3 | 2 | 1 | 48 | 47 | 46 | 45 | 42 | 41 | 39 | 35 | 34 | 32 | 28 | 27 | 23 | 14 | 9 | 8 | 6 | 5 | 21 | 17 | 11 | 7 | 44 | 37 | 30 | 22 | 20 | 18 | 43 | 36 | 26 | 24 | 16 | 10 | 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondent | pr | pr | pu | pu | pr | pu | pr | pr | pr | pr | pu | pu | pr | pr | pr | pr | pr | pr | pu | pu | pu | pr | pu | pu | pr | pu | pr | pr | pu | pu | pr | pu | pr | pu | pu | pu | pr | pu | pr | pr | pu | pu | pu | pr | pr | pu | pu | pr | pu | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | off | off | rdt | stl | rdt | rdt | rdt/b | rdt | rlt | fld | fld | w/s | rlt | w/s | rlt | | |
| | ***Attributes*** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **isub** | **imain** |
| | **Socio-Economic** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.673** |
| es1 | Availability of traditional projects. | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 5 | 3 | 3 | 4 | 3 | 5 | 3 | 1 | 1 | 5 | 3 | 2 | 2 | 4 | 2 | 4 | 3 | 1 | 1 | 2 | 3 | 3 | 3 | 2 | 4 | 4 | 5 | 5 | 4 | 2 | 2 | 3 | 1 | 3 | 3 | 4 | | **0.600** |
| es2 | Maturity of the financial markets. | 4 | 3 | 4 | 4 | 3 | 4 | 5 | 4 | 5 | 4 | 3 | 5 | 4 | 4 | 3 | 5 | 5 | 4 | 4 | 3 | 2 | 4 | 5 | 4 | 4 | 2 | 5 | 3 | 4 | 3 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 3 | 3 | 2 | 1 | 3 | 3 | 4 | | **0.735** |
| es3 | Perceived future economic uncertainties | 4 | 3 | 4 | 4 | 3 | 4 | 3 | 3 | 3 | 5 | 2 | 4 | 4 | 3 | 2 | 4 | 4 | 4 | 3 | 4 | 3 | 3 | 5 | 5 | 4 | 3 | 4 | 2 | 3 | 3 | 3 | 2 | 2 | 4 | 3 | 5 | 3 | 4 | 5 | 5 | 3 | 4 | 3 | 4 | 2 | 1 | 3 | 3 | 3 | | **0.682** |
| es4 | Potential for future equity purchase in PPP projects | 3 | 3 | 4 | 3 | 4 | 1 | 3 | 3 | 5 | 4 | 2 | 3 | 4 | 3 | 2 | 3 | 5 | 3 | 1 | 3 | 2 | 3 | 4 | 2 | 3 | 2 | 4 | 3 | 3 | 2 | 3 | 4 | 2 | 4 | 4 | 4 | 4 | 3 | 5 | 5 | 2 | 5 | 2 | 2 | 3 | 1 | 3 | 3 | 5 | | **0.629** |
| es5 | Strong public/private sector relationships. | 5 | 4 | 4 | 5 | 4 | 3 | 5 | 3 | 5 | 3 | 4 | 5 | 4 | 4 | 3 | 4 | 4 | 4 | 5 | 3 | 4 | 3 | 1 | 3 | 4 | 4 | 4 | 4 | 2 | 3 | 2 | 3 | 4 | 3 | 5 | 2 | 3 | 4 | 1 | 5 | 5 | 3 | 4 | 5 | 3 | 4 | 2 | 3 | 3 | 4 | **0.722** |
| | | 20 | 16 | 19 | 19 | 17 | 15 | 19 | 16 | 21 | 19 | 13 | 20 | 19 | 19 | 13 | 19 | 22 | 18 | 18 | 16 | 12 | 14 | 20 | 17 | 17 | 13 | 21 | 12 | 17 | 13 | 12 | 13 | 11 | 20 | 16 | 19 | 17 | 16 | 24 | 25 | 17 | 22 | 15 | 14 | 14 | 6 | 15 | 15 | 20 | | |
| | **Political/Legal/Regulatory regime** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.623** |
| ep1 | Public acceptability of the PPP/Private Finance philosophy | 5 | 2 | 5 | 4 | 5 | 3 | 4 | 4 | 4 | 4 | 2 | 3 | 4 | 4 | 4 | 4 | 5 | 3 | 4 | 2 | 3 | 3 | 1 | 4 | 4 | 4 | 5 | 3 | 4 | 3 | 3 | 3 | 4 | 5 | 4 | 5 | 5 | 3 | 5 | 5 | 4 | 5 | 4 | 4 | 3 | 1 | 4 | 1 | 4 | | **0.739** |
| ep2 | Stability of the political system. | 4 | 3 | 5 | 3 | 5 | 4 | 5 | 3 | 3 | 4 | 2 | 5 | 4 | 5 | 2 | 4 | 5 | 3 | 4 | 3 | 3 | 3 | 1 | 4 | 4 | 4 | 4 | 3 | 4 | 5 | 1 | 3 | 4 | 5 | 2 | 5 | 5 | 5 | 5 | 5 | 2 | 4 | 3 | 4 | 3 | 3 | 4 | 1 | 3 | | **0.727** |
| ep3 | Level of all-party political support for the philosophy | 5 | 3 | 5 | 4 | 4 | 2 | 4 | 3 | 3 | 4 | 3 | 5 | 4 | 4 | 2 | 4 | 5 | 3 | 3 | 3 | 2 | 5 | 2 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 2 | 4 | 5 | 2 | 5 | 5 | 5 | 5 | 5 | 2 | 4 | 4 | 3 | 3 | 1 | 5 | 1 | 3 | | **0.718** |
| el1 | Clearly defined planning and regulatory frameworks. | 4 | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 5 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 2 | 5 | 3 | 4 | 5 | 5 | 4 | 5 | 4 | 5 | 2 | 4 | 5 | 4 | 2 | 3 | 5 | 2 | 5 | 4 | 4 | 2 | 5 | 4 | 4 | 3 | 5 | 3 | 3 | 4 | 3 | 3 | | **0.751** |
| el2 | Ability of foreign investors to repatriate earnings | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 3 | 1 | 4 | 2 | 3 | 1 | 2 | 2 | 2 | 3 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 3 | 1 | 3 | 4 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 1 | 2 | 5 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 4 | **0.396** |
| el3 | Clearly defined legislation on foreign ownership of property | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 4 | 1 | 3 | 1 | 2 | 2 | 2 | 1 | 2 | 3 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 3 | 1 | 3 | 3 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 2 | 2 | 2 | 5 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 4 | **0.400** |
| el4 | Clearly defined legislation on intellectual property rights | 3 | 4 | 3 | 2 | 4 | 1 | 2 | 3 | 5 | 3 | 2 | 2 | 3 | 3 | 1 | 3 | 4 | 2 | 2 | 3 | 2 | 1 | 1 | 2 | 4 | 1 | 3 | 2 | 2 | 4 | 1 | 1 | 1 | 4 | 3 | 4 | 2 | 3 | 4 | 5 | 3 | 3 | 2 | 1 | 1 | 1 | 3 | 2 | 3 | | **0.506** |
| el5 | Clearly established institutional and policy frameworks on PPP/PFI | 5 | 3 | 3 | 4 | 4 | 4 | 5 | 4 | 5 | 3 | 2 | 2 | 4 | 3 | 2 | 3 | 3 | 2 | 5 | 5 | 3 | 4 | 4 | 3 | 4 | 1 | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 3 | 3 | 4 | 5 | 2 | 3 | 5 | 2 | 4 | | **0.747** |
| | | 33 | 24 | 30 | 24 | 31 | 19 | 25 | 27 | 27 | 29 | 17 | 25 | 26 | 27 | 18 | 26 | 33 | 19 | 25 | 23 | 21 | 23 | 16 | 25 | 31 | 20 | 31 | 25 | 24 | 29 | 19 | 17 | 22 | 31 | 22 | 35 | 30 | 27 | 29 | 40 | 21 | 27 | 24 | 24 | 17 | 14 | 27 | 14 | 28 | | |

# General Rating of External Environment Attributes - Split 1

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | project ID | 19 | 15 | 13 | 12 | 3 | 2 | 1 | 32 | 28 | 27 | 23 | 14 | 9 | 8 | 6 | 5 | 11 | 7 | 36 | 26 | 24 | 16 | 10 | 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondent | pr | pr | pr | pu | pu | pr | pr | pu | pr | pu | pr | pr | pu | pu | pr | pu | pu | pu | pr | pr | pu | pu | pr | pu | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | fld | fld | w/s | rlt | w/s | rlt | | |
| | ***Attributes*** | | | | | | | | | | | | | | | | | | | | | | | | | **lsub** | **lmain** |
| | **Socio-Economic** | | | | | | | | | | | | | | | | | | | | | | | | | | **0.635** |
| es1 | Availability of traditional projects. | 3 | 3 | 3 | 2 | 3 | 3 | 5 | 3 | 2 | 2 | 4 | 2 | 4 | 3 | 1 | 1 | 3 | 3 | 2 | 3 | 1 | 3 | 3 | 4 | **0.550** | |
| es2 | Maturity of the financial markets. | 4 | 5 | 4 | 3 | 5 | 4 | 4 | 4 | 4 | 2 | 5 | 3 | 4 | 3 | 2 | 2 | 4 | 4 | 3 | 2 | 1 | 3 | 3 | 4 | **0.683** | |
| es3 | Perceived future economic uncertainties | 3 | 3 | 5 | 2 | 4 | 4 | 3 | 5 | 4 | 3 | 4 | 2 | 3 | 3 | 3 | 2 | 3 | 5 | 4 | 2 | 1 | 3 | 3 | 3 | **0.642** | |
| es4 | Potential for future equity purchase in PPP projects | 3 | 5 | 4 | 2 | 3 | 4 | 3 | 2 | 3 | 2 | 4 | 3 | 3 | 2 | 3 | 4 | 4 | 4 | 2 | 3 | 1 | 3 | 3 | 5 | **0.625** | |
| es5 | Strong public/private sector relationships. | 3 | 5 | 3 | 4 | 5 | 4 | 4 | 3 | 4 | 4 | 4 | 2 | 3 | 2 | 3 | 4 | 2 | 3 | 3 | 4 | 2 | 3 | 3 | 4 | **0.675** | |
| | | 16 | 21 | 19 | 13 | 20 | 19 | 19 | 17 | 17 | 13 | 21 | 12 | 17 | 13 | 12 | 13 | 16 | 19 | 14 | 14 | 6 | 15 | 15 | 20 | | |
| | **Political/Legal/Regulatory regime** | | | | | | | | | | | | | | | | | | | | | | | | | | **0.604** |
| ep1 | Public acceptability of the PPP/Private Finance philosophy. | 4 | 4 | 4 | 2 | 3 | 4 | 4 | 4 | 4 | 4 | 5 | 3 | 4 | 3 | 3 | 3 | 4 | 5 | 4 | 3 | 1 | 4 | 1 | 4 | **0.700** | |
| ep2 | Stability of the political system. | 3 | 3 | 4 | 2 | 5 | 4 | 5 | 4 | 4 | 4 | 4 | 3 | 4 | 5 | 1 | 3 | 2 | 5 | 4 | 3 | 3 | 4 | 1 | 3 | **0.692** | |
| ep3 | Level of all-party political support for the philosophy. | 3 | 3 | 4 | 3 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 2 | 2 | 5 | 3 | 3 | 1 | 5 | 1 | 3 | **0.675** | |
| el1 | Clearly defined planning and regulatory frameworks. | 3 | 5 | 4 | 3 | 3 | 4 | 4 | 4 | 5 | 4 | 5 | 2 | 4 | 5 | 4 | 2 | 2 | 5 | 5 | 3 | 3 | 4 | 3 | 3 | **0.742** | |
| el2 | Ability of foreign investors to repatriate earnings. | 3 | 1 | 4 | 2 | 3 | 1 | 2 | 2 | 3 | 1 | 3 | 4 | 1 | 2 | 1 | 1 | 2 | 3 | 1 | 1 | 1 | 1 | 2 | 4 | **0.408** | |
| el3 | Clearly defined legislation on foreign ownership of property | 4 | 1 | 3 | 1 | 2 | 2 | 2 | 2 | 3 | 1 | 3 | 3 | 1 | 2 | 1 | 1 | 3 | 3 | 1 | 1 | 1 | 1 | 2 | 4 | **0.400** | |
| el4 | Clearly defined legislation on intellectual property rights. | 3 | 5 | 3 | 2 | 2 | 3 | 3 | 2 | 4 | 1 | 3 | 2 | 2 | 4 | 1 | 1 | 3 | 4 | 1 | 1 | 1 | 3 | 2 | 3 | **0.492** | |
| el5 | Clearly established institutional and policy frameworks on PPP/PFI | 4 | 5 | 3 | 2 | 2 | 4 | 3 | 3 | 4 | 1 | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 5 | 2 | 3 | 5 | 2 | 4 | **0.725** | |
| | | 27 | 27 | 29 | 17 | 25 | 26 | 27 | 25 | 31 | 20 | 31 | 25 | 24 | 29 | 19 | 17 | 22 | 35 | 24 | 17 | 14 | 27 | 14 | 28 | | |

# General Rating of External Environment Attributes - Split 2

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | project ID | 50 | 49 | 40 | 38 | 33 | 31 | 29 | 48 | 47 | 46 | 45 | 42 | 41 | 39 | 35 | 34 | 21 | 17 | 44 | 37 | 30 | 22 | 20 | 18 | 43 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondent | pr | pr | pu | pu | pr | pu | pr | pr | pr | pr | pr | pu | pu | pu | pr | pu | pr | pu | pr | pu | pr | pr | pu | pu | pu | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | rdt | stl | rdt | rdt | rdt/b | rdt | rlt | | |
| | ***Attributes*** | | | | | | | | | | | | | | | | | | | | | | | | | | **isub** | **imain** |
| | **Socio-Economic** | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.710** |
| es1 | Availability of traditional projects. | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 5 | 3 | 1 | 1 | 5 | 2 | 3 | 2 | 4 | 4 | 5 | 5 | 4 | 2 | **0.648** | |
| es2 | Maturity of the financial markets. | 4 | 3 | 4 | 4 | 3 | 4 | 5 | 3 | 5 | 5 | 4 | 4 | 3 | 2 | 4 | 5 | 2 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 3 | **0.784** | |
| es3 | Perceived future economic uncertainties | 4 | 3 | 4 | 4 | 3 | 4 | 3 | 2 | 4 | 4 | 4 | 3 | 4 | 3 | 3 | 5 | 2 | 4 | 3 | 4 | 5 | 5 | 3 | 4 | 3 | **0.720** | |
| es4 | Potential for future equity purchase in PPP projects | 3 | 3 | 4 | 3 | 4 | 1 | 3 | 2 | 3 | 5 | 3 | 1 | 3 | 2 | 3 | 4 | 2 | 4 | 4 | 3 | 5 | 5 | 2 | 5 | 2 | **0.632** | |
| es5 | Strong public/private sector relationships. | 5 | 4 | 4 | 5 | 4 | 3 | 5 | 3 | 4 | 4 | 4 | 5 | 3 | 4 | 3 | 1 | 3 | 5 | 4 | 1 | 5 | 5 | 3 | 4 | 5 | **0.768** | |
| | | 20 | 16 | 19 | 19 | 17 | 15 | 19 | 13 | 19 | 22 | 18 | 18 | 16 | 12 | 14 | 20 | 11 | 20 | 17 | 16 | 24 | 25 | 17 | 22 | 15 | | |
| | **Political/Legal/Regulatory regime** | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.641** |
| ep1 | Public acceptability of the PPP/Private Finance philosophy. | 5 | 2 | 5 | 4 | 5 | 3 | 4 | 4 | 4 | 5 | 3 | 4 | 2 | 3 | 3 | 1 | 4 | 5 | 5 | 3 | 5 | 5 | 4 | 5 | 4 | **0.776** | |
| ep2 | Stability of the political system. | 4 | 3 | 5 | 3 | 5 | 4 | 5 | 2 | 4 | 5 | 3 | 4 | 3 | 3 | 3 | 1 | 4 | 5 | 5 | 5 | 5 | 5 | 2 | 4 | 3 | **0.760** | |
| ep3 | Level of all-party political support for the philosophy. | 5 | 3 | 5 | 4 | 4 | 2 | 4 | 2 | 4 | 5 | 3 | 3 | 3 | 2 | 5 | 2 | 4 | 5 | 5 | 5 | 5 | 5 | 2 | 4 | 4 | **0.760** | |
| el1 | Clearly defined planning and regulatory frameworks. | 4 | 3 | 3 | 3 | 5 | 3 | 3 | 4 | 4 | 5 | 2 | 5 | 3 | 4 | 5 | 5 | 3 | 5 | 4 | 4 | 2 | 5 | 4 | 4 | 3 | **0.760** | |
| el2 | Ability of foreign investors to repatriate earnings. | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 2 | 2 | 3 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 5 | 1 | 2 | 2 | **0.384** | |
| el3 | Clearly defined legislation on foreign ownership of property | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 3 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 5 | 2 | 2 | 2 | **0.400** | |
| el4 | Clearly defined legislation on intellectual property rights. | 3 | 4 | 3 | 2 | 4 | 1 | 2 | 1 | 3 | 4 | 2 | 2 | 3 | 2 | 1 | 1 | 1 | 4 | 2 | 3 | 4 | 5 | 3 | 3 | 2 | **0.520** | |
| el5 | Clearly established institutional and policy frameworks on PPP/PFI | 5 | 3 | 3 | 4 | 4 | 4 | 5 | 2 | 3 | 3 | 2 | 5 | 5 | 3 | 4 | 4 | 4 | 5 | 5 | 4 | 4 | 5 | 3 | 3 | 4 | **0.768** | |
| | | 33 | 24 | 30 | 24 | 31 | 19 | 25 | 18 | 26 | 33 | 19 | 25 | 23 | 21 | 23 | 16 | 22 | 31 | 30 | 27 | 29 | 40 | 21 | 27 | 24 | | |

Appendix C.1

## Split half test - Extl Env't Attributes

| | *Attributes* | overall rating (A) *n = 49* | | | | split 1 ratings (B) *n = 24* | | | | split 2 rating (C ) *n = 25* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *I sub* | *r sub* | *I main* | *r main* | *I sub* | *r sub* | *I main* | *r main* | *I sub* | *r sub* | *I main* | *r main* |
| | **Socio-Economic** | | | 0.673 | 1 | | | 0.635 | 1 | | | 0.710 | 1 |
| es1 | Availability of traditional projects | 0.600 | 5 | | | 0.550 | 5 | | | 0.648 | 4 | | |
| es2 | Maturity of the financial markets | 0.735 | 1 | | | 0.683 | 1 | | | 0.784 | 1 | | |
| es3 | Perceived future economic uncertainties | 0.682 | 3 | | | 0.642 | 3 | | | 0.720 | 3 | | |
| es4 | Potential for future equity purchase in PPP pjts | 0.629 | 4 | | | 0.625 | 4 | | | 0.632 | 5 | | |
| es5 | Strong public/private sector relationships | 0.722 | 2 | | | 0.675 | 2 | | | 0.768 | 2 | | |
| | **Political /Legal/Regulatory Regime** | | | 0.623 | 2 | | | 0.604 | 2 | | | 0.641 | 2 |
| ep1 | Public acceptability of the PPP/Private Finance philosophy | 0.739 | 3 | | | 0.700 | 3 | | | 0.776 | 1 | | |
| ep2 | Stability of the political system | 0.727 | 4 | | | 0.692 | 4 | | | 0.760 | 4 | | |
| ep3 | Level of all-party political support for the philosophy | 0.718 | 5 | | | 0.675 | 5 | | | 0.760 | 4 | | |
| el1 | Clearly defined planning and regulatory frameworks | 0.751 | 1 | | | 0.742 | 1 | | | 0.760 | 4 | | |
| el2 | Ability of foreign investors to repatriate earnings | 0.396 | 8 | | | 0.408 | 7 | | | 0.384 | 8 | | |
| el3 | Clearly defined legislation on foreign ownership of property | 0.400 | 7 | | | 0.400 | 8 | | | 0.400 | 7 | | |
| el4 | Clearly defined legislation on intellectual property rights | 0.506 | 6 | | | 0.492 | 6 | | | 0.520 | 6 | | |
| el5 | Clearly established institutional and policy frameworks on PPP/PFI | 0.747 | 2 | | | 0.725 | 2 | | | 0.768 | 2 | | |

*Notes:*

*I* sub.- relative significance index for the sub-attributes

*r* sub - ranking of the sub-attributs

*I main*.- relative significance index of the main attributes

*r main* - ranking of the main attributes

rho - spearman's rank correlation coefficient

| | rho |
|---|---|
| rho between A and B for socio-economic | 1.000 |
| rho between A and C for socio-economic | 0.866 |
| rho between B and C for socio-economic | 0.913 |
| ***rhoes av*** | ***0.926*** |
| rho between A and B for political/legal/regulatory regime | 0.976 |
| rho between A and C ditto | 0.830 |
| rho between B and C ditto | 0.805 |
| ***rhoepel av*** | ***0.870*** |
| rhoavo'all | **0.898** |

at 0.005 level of significance with N=13, rhocritical from statistical tables is **0.703**
since 0.838 is greater than 0.703 *Ho* is rejected

$p < 0.001$

For N = 13, *rhoav* = 0.900 from the statistical tables shows that a value as large as this is significant at $p < 0.001$ level (one-tail test). Thus we could reject *Ho* at $\alpha = 0.001$ level.

### Further check using Kendall's Coefficient of Concordance

From the relationship $rhoav = \frac{kW-1}{k-1}$

where
*W* = Kendall Coefficient of Concordance (level of agreement)
*k* = is the sets of ranking (= 3)

*Hence* $W = \frac{rhoav(k-1)+1}{k}$

W= *0.932*

again $\chi 2 = k(N-1)W$

with N = 13

$\chi 2 =$ 33.560

From statistical tables we find that $\chi^2 \geq$ 33.560
with a degree of freedom, *df* = N - 1 = 12 has a probability of occurrence under *Ho* of $p < 0.001$. Hence it can be concluded with considerable assurance that the likelihood of the samples coming from the same population is higher than it will be by chance.

The very low probability under the *Ho* associated with the observed value of *W* enables us to reject the null hypothesis that the ratings for the sets are unrelated. Hence we accept the alternative hypothesis that the ratings are related.

## General Rating of main components - all projects

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | project ID | 50 | 49 | 40 | 38 | 33 | 31 | 29 | 19 | 15 | 13 | 12 | 3 | 2 | 1 | 48 | 47 | 46 | 45 | 42 | 41 | 39 | 35 | 34 | 32 | 28 | 27 | 23 | 14 | 9 | 8 | 6 | 5 | 21 | 17 | 11 | 7 | 44 | 37 | 30 | 22 | 20 | 18 | 43 | 36 | 26 | 24 | 16 | 10 | 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondent | pr | pr | pu | pu | pr | pu | pr | pr | pr | pr | pu | pu | pr | pr | pr | pr | pr | pr | pu | pu | pu | pr | pu | pu | pr | pu | pr | pr | pu | pu | pr | pu | pr | pu | pu | pu | pr | pu | pr | pr | pu | pu | pr | pr | pu | pu | pr | pu | | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | off | off | rdt | stl | rdt | rdt | rdt/b | rdt | rlt | fld | fld | w/s | rlt | w/s | rlt | | |
| | ***Attributes*** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ***index*** | ***ranking*** |
| ca | **Consortium Attributes** | 3 | 4 | 3 | 3 | 2 | 4 | 4 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 1 | 3 | 4 | 3 | 3 | 4 | 4 | 4 | 2 | 4 | 3 | 4 | 4 | 4 | 3 | 3 | 2 | 4 | 3 | 3 | 4 | 3 | 3 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | **0.653** | **2** |
| psa | **Public Sector Client Attributes** | 4 | 3 | 2 | 4 | 2 | 2 | 4 | 4 | 1 | 4 | 3 | 3 | 4 | 4 | 3 | 4 | 3 | 2 | 4 | 3 | 4 | 3 | 4 | 4 | 3 | 3 | 4 | 3 | 3 | 2 | 3 | 4 | 2 | 4 | 4 | 2 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 2 | 2 | 3 | 4 | 4 | 4 | **0.657** | **1** |
| pa | **Project Attributes** | 3 | 2 | 4 | 2 | 4 | 3 | 3 | 2 | 3 | 4 | 3 | 4 | 2 | 1 | 4 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 3 | 4 | 3 | 2 | 3 | 3 | 3 | 4 | 1 | 3 | 4 | 1 | 3 | 4 | 4 | 3 | 4 | 4 | 3 | 4 | 2 | 3 | 3 | 2 | 3 | 4 | 3 | **0.588** | **3** |
| eea | **External Environment Attributes** | 4 | 3 | 1 | 1 | 1 | 1 | 2 | 4 | 4 | 3 | 1 | 1 | 2 | 3 | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 3 | 4 | 1 | 2 | 2 | 2 | 1 | 4 | 2 | 1 | 2 | 2 | 1 | 3 | 3 | 4 | 4 | 3 | 3 | 1 | 1 | 2 | 1 | 3 | 1 | 2 | **0.416** | **4** |

***Notes***

$$(index) \cdot \sum_{i=1}^{n} r/(r^* xn)$$

where (i*sub*) = the relative significance index for the sub-attributes;
(i*main*) = the relative significance index for the main attributes;
r = the degree of significance assigned by each respondent to the *i* th attribute;
* = the ideal or anchor score i.e. highest score (5 in this case)
n = the number of responses;

pr = private
pu = public
hlth = health
sch = school
off = offices
rdt = road transport
fld = flood defence
w/s = water and sewerage
rlt = rail transport

## General Rating of Main Components - all projects - Split 1

| | project ID | 19 | 15 | 13 | 12 | 3 | 2 | 1 | 32 | 28 | 27 | 23 | 14 | 9 | 8 | 6 | 5 | 11 | 7 | 36 | 26 | 24 | 16 | 10 | 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondent | pr | pr | pr | pu | pu | pr | pr | pu | pr | pu | pr | pr | pu | pu | pr | pu | pu | pu | pr | pr | pu | pu | pr | pu | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | fld | fld | w/s | rlt | w/s | rlt | | |
| | ***Attributes*** | | | | | | | | | | | | | | | | | | | | | | | | | ***index*** | ***ranking*** |
| ca | **Consortium Attributes** | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 4 | 3 | 4 | 4 | 4 | 3 | 3 | 2 | 4 | 4 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | **0.650** | 1 |
| psa | **Public Sector Client Attributes** | 4 | 1 | 4 | 3 | 3 | 4 | 4 | 4 | 3 | 3 | 4 | 3 | 3 | 2 | 3 | 4 | 4 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | **0.642** | 2 |
| pa | **Project Attributes** | 2 | 3 | 4 | 3 | 4 | 2 | 1 | 4 | 3 | 2 | 3 | 3 | 3 | 4 | 1 | 3 | 3 | 4 | 3 | 3 | 2 | 3 | 4 | 3 | **0.583** | 3 |
| eea | **External Environment Attributes** | 4 | 4 | 3 | 1 | 1 | 2 | 3 | 3 | 4 | 1 | 2 | 2 | 2 | 1 | 4 | 2 | 2 | 1 | 1 | 2 | 1 | 3 | 1 | 2 | **0.433** | 4 |

## General Rating of Main Components - all projects - Split 2

| | project ID | 50 | 49 | 40 | 38 | 33 | 31 | 29 | 48 | 47 | 46 | 45 | 42 | 41 | 39 | 35 | 34 | 21 | 17 | 44 | 37 | 30 | 22 | 20 | 18 | 43 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondent | pr | pr | pu | pu | pr | pu | pr | pr | pr | pr | pr | pu | pu | pu | pr | pu | pr | pu | pr | pu | pr | pr | pu | pu | pu | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | rdt | stl | rdt | rdt | rdt/b | rdt | rlt | | |
| | ***Attributes*** | | | | | | | | | | | | | | | | | | | | | | | | | | ***index*** | ***ranking*** |
| ca | **Consortium Attributes** | 3 | 4 | 3 | 3 | 2 | 4 | 4 | 1 | 3 | 4 | 3 | 3 | 4 | 4 | 4 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 4 | 3 | **0.656** | 2 |
| psa | **Public Sector Client Attributes** | 4 | 3 | 2 | 4 | 2 | 2 | 4 | 3 | 4 | 3 | 2 | 4 | 3 | 4 | 3 | 4 | 2 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | **0.672** | 1 |
| pa | **Project Attributes** | 3 | 2 | 4 | 2 | 4 | 3 | 3 | 4 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 3 | 4 | 1 | 4 | 3 | 4 | 4 | 3 | 4 | 2 | **0.592** | 3 |
| eea | **External Environment Attributes** | 4 | 3 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 3 | 3 | 1 | **0.400** | 4 |

Appendix C.1

## Split half test - Main Components

| | | overall rating (A) *n* = 49 | | split 1 rating (B) *n* = 24 | | split 2 rating C *n* = 25 | |
|---|---|---|---|---|---|---|---|
| | ***Components*** | ***I comp*** | ***r comp*** | ***I comp*** | ***r comp*** | ***I comp*** | ***r comp*** |
| ca | **Consortium Attributes** | **0.653** | 2 | **0.650** | 1 | **0.656** | 2 |
| psa | **Public Sector Client Attributes** | **0.657** | 1 | **0.642** | 2 | **0.672** | 1 |
| pa | **Project Attributes** | **0.588** | 3 | **0.583** | 3 | **0.592** | 3 |
| eea | **External Environment Attributes** | **0.416** | 4 | **0.433** | 4 | **0.400** | 4 |

| | rho |
|---|---|
| **rho between A and B** | **0.800** |
| **rho between A and C** | **1.000** |
| **rho between B and C** | **0.982** |
| ***rhocomp*** **av** | ***0.927*** |

*Notes:*
***I comp:-*** **relative significance index for the main component**
***r comp:-*** **ranking of the main components**
**rho:- spearmam's rank correlation coefficient**

at 0.05 level of significance with N=4, ***rho*** critical from statistical tables is **1.000**

*0.10* < *p* < 0.25

For N = 4, ***rhoav*** = 0.927 from the statistical tables shows that a value as large as this is significant at 0.10 < *p* < 0.25 level (one-tail test). Thus we could only reject *Ho* at $\alpha = 0.25$ level.

**Further check using Kendall's Coefficient of Concordance**

From the relationship $\boxed{rhoav = \frac{kW-1}{k-1}}$

where

*W* = Kendall Coefficient of Concordance (level of agreement)

*k* = is the sets of ranking (= 3)

*Hence* $\boxed{W = \frac{rhoav(k-1)+1}{k}}$

W = *0.952*

again $\boxed{\chi 2 = k(N-1)W}$

with N = 4

$\boxed{\chi 2 =}$ 8.564

From statistical tables we find that $\boxed{\chi^2} \boxed{\geq}$ 8.564 with a degree of freedom, *df* = N - 1 = 3 has a probability of occurrence under *Ho* of *p* < 0.001. Hence it can be concluded with considerable assurance that the likelihood of the samples coming from the same population is higher than it will be by chance.

The very low probability under the *Ho* associated with the observed value of *W* enables us to reject the null hypothesis that the ratings for the sets are unrelated. Hence we accept the alternative hypothesis that the ratings are related.

# Appendix C.2 Comprehensive listing of the hierarchy of Attributes

## Public Sector Attributes

| code | Attributes | *i sub* | *ranking* | *i main* |
|---|---|---|---|---|
| po | ***Organisational Capabilities*** | | | **0.736** |
| po5 | Top level commitment | **0.902** | 1 | |
| po6 | Team collaboration and commitment | **0.865** | 2 | |
| po7 | Open/frank and flexible communication | **0.849** | 3 | |
| po11 | Commitment to earlier negotiated terms | **0.747** | 4.5 | |
| po3 | Level of bureaucracy in the decision making process | **0.747** | 4.5 | |
| po12 | Ability to accept and absorb risks | **0.714** | 6 | |
| po9 | Assisting in land acquisition and in obtaining permits | **0.698** | 7 | |
| po4 | Right attitude to cost | **0.694** | 8 | |
| po1 | Ability to effectively sensitise public opinion | **0.686** | 9 | |
| po10 | Tapping knowledge and expertise gained elsewhere | **0.665** | 10 | |
| po8 | Pre-established PPP Unit | **0.637** | 11 | |
| po2 | Level of reputation enjoyed by the organisation. | **0.633** | 12 | |

| code | Attributes | *i sub* | *ranking* | *i main* |
|---|---|---|---|---|
| pt | ***Technical Capabilities*** | | | **0.739** |
| pt6 | Clear output specifications | **0.829** | 1 | |
| pt1 | Strong in-house expertise | **0.759** | 3 | |
| pt2 | Sound preparatory work | **0.759** | 3 | |
| pt5 | Clearly established evaluation criteria | **0.759** | 3 | |
| pt4 | Experience in infrastructure procurement | **0.698** | 5 | |
| pt7 | The use of standard bidding documents | **0.690** | 6 | |
| pt3 | Previous experience in PPP procurement | **0.678** | 7 | |

| code | Attributes | *i sub* | *ranking* | *i main* |
|---|---|---|---|---|
| | ***Financial Capabilities*** | | | **0.578** |
| pf5 | Capability to pay | **0.767** | 1 | |
| pf2 | Strong financial support/guarantees from the central govt | **0.747** | 2 | |
| pf3 | Flexible tax regimes. | **0.465** | 3 | |
| pf1 | Ability to raise funds through Bonds. | **0.457** | 4 | |
| pf4 | Ability to provide equity finance. | **0.453** | 5 | |

## Consortium Attributes

| code | Attributes | *i sub* | *ranking* | *i main* |
|---|---|---|---|---|
| cs | ***Orgnisational Nature and Strength*** | | | **0.738** |
| cs9 | Appointing a dedicated bid manager | **0.865** | 1 | |
| cs10 | Understanding the public sector needs. | **0.853** | 2 | |
| cs6 | Open/frank communication. | **0.841** | 3 | |
| cs15 | Early involvement of other stakeholders | **0.833** | 4 | |
| cs11 | Ability to work harmoniously. | **0.820** | 5 | |
| cs5 | Readiness to accept risk. | **0.816** | 6 | |
| cs17 | Perseverance during protracted negotiations. | **0.812** | 7 | |
| cs1 | Previous experience in PPP. | **0.792** | 8 | |
| cs16 | Champion's personal attribute | **0.755** | 9 | |
| cs7 | Commitment to earlier negotiated terms. | **0.761** | 10 | |
| cs2 | Consortium's reputation. | **0.702** | 11 | |
| cs3 | PPP being a strategic business interest | **0.686** | 12 | |
| cs4 | Ability to tie equity for a long period. | **0.682** | 13 | |
| cs18 | Multidisciplinary team. | **0.669** | 14 | |
| cs12 | Previous experience as a team | **0.665** | 15 | |
| cs14 | Timely planning permission. | **0.657** | 16 | |
| cs13 | Proactive role in initiating the project. | **0.629** | 17 | |
| cs8 | Current job holding. | **0.604** | 18 | |
| cs19 | Previous experience with client. | **0.596** | 19 | |

| code | Attributes | *i sub* | *ranking* | *i main* |
|---|---|---|---|---|
| ct | ***Quality of Technical Proposal*** | | | **0.723** |
| ct2 | Clarity of submissions/responses | **0.800** | 1 | |
| ct1 | Robustness of outline technical proposal. | **0.780** | 2 | |
| ct4 | Provision of sound technical guarantee. | **0.673** | 3 | |
| ct3 | Innovative technical solutions. | **0.641** | 4 | |

| code | Attributes | *i sub* | *ranking* | *i main* |
|---|---|---|---|---|
| | ***Quality of the Financial Proposal*** | | | **0.652** |
| cf4 | Levels of tariff/tolls proposed | **0.846** | 1 | |
| cf5 | Credibility of financiers | **0.767** | 2 | |
| cf6 | Client's exposure to financial risks | **0.763** | 3 | |
| cf1 | Financial guarantees provided/proposed | **0.739** | 4 | |
| cf2 | Payment mechanisms proposed | **0.731** | 5 | |
| cf3 | Government funding/guarantees required. | **0.641** | 6 | |
| cf8 | Length of concession period proposed. | **0.567** | 7 | |
| cf7 | Financial returns to the public sector client. | **0.551** | 8 | |
| cf10 | High Equity/debt ratio to drive commitment. | **0.465** | 9 | |
| cf9 | Third party revenue to be generated. | **0.453** | 10 | |

**Project Attributes**

| code | Attributes | *i sub* | *ranking* | *i main* |
|---|---|---|---|---|
| pn | ***Nature of Project*** | | | **0.665** |
| pn1 | Size and complexity | **0.788** | 1 | |
| pn3 | Project risk management | **0.759** | 2.5 | |
| pn8 | Ability to respond to future changes. | **0.759** | 2.5 | |
| pn7 | Design completion required at tender. | **0.702** | 4 | |
| pn9 | Project location and site conditions | **0.694** | 5 | |
| pn4 | Impact on the environment | **0.633** | 6 | |
| pn10 | Uniqueness of project | **0.624** | 7.5 | |
| pn2 | Amenability to innovation | **0.624** | 7.5 | |
| pn6 | Health and safety provoked | **0.584** | 9.5 | |
| pn11 | Effect on existing public sector staff | **0.584** | 9.5 | |
| pn5 | Third party improving existing infrastructure | **0.563** | 11 | |

| code | Attributes | *i sub* | *ranking* | *i main* |
|---|---|---|---|---|
| pm | ***Marketability of project*** | | | **0.656** |
| pm5 | Bankability of project | **0.890** | 1 | |
| pm1 | Suitability for private participation | **0.824** | 2 | |
| pm2 | Meeting general public needs | **0.755** | 3 | |
| pm10 | Level of tariffs and tolls. | **0.722** | 4 | |
| pm4 | Useful life after concession period. | **0.661** | 5 | |
| pm3 | Potential for land and property buyouts. | **0.637** | 6 | |
| pm8 | Opportunities for future refinancing | **0.584** | 7 | |
| pm6 | Monopolistic advantage | **0.539** | 8 | |
| pm9 | Potential for property development rights | **0.494** | 9 | |
| pm7 | Third party revenue potentials | **0.453** | 10 | |

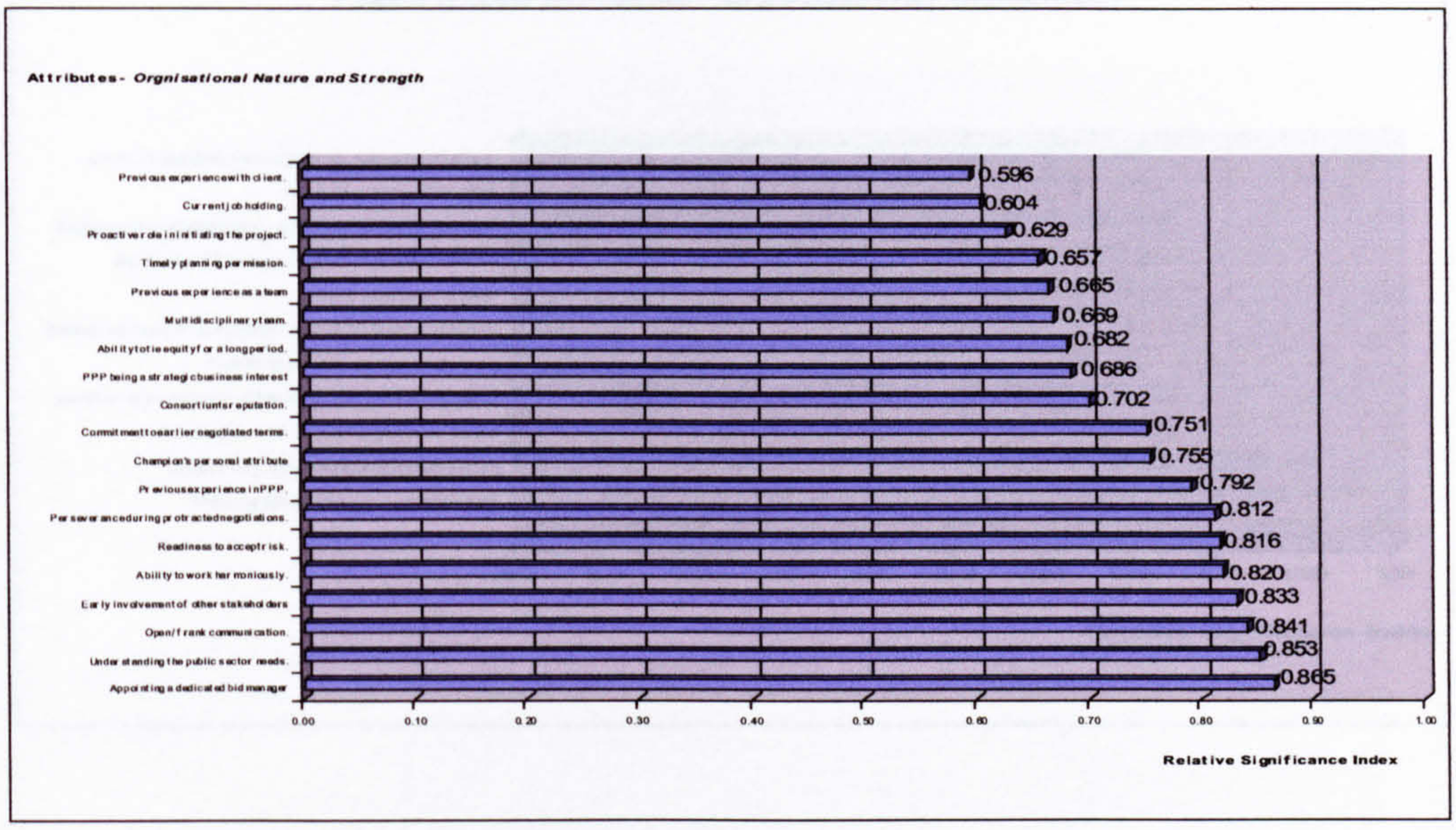
**External Environment Attributes**

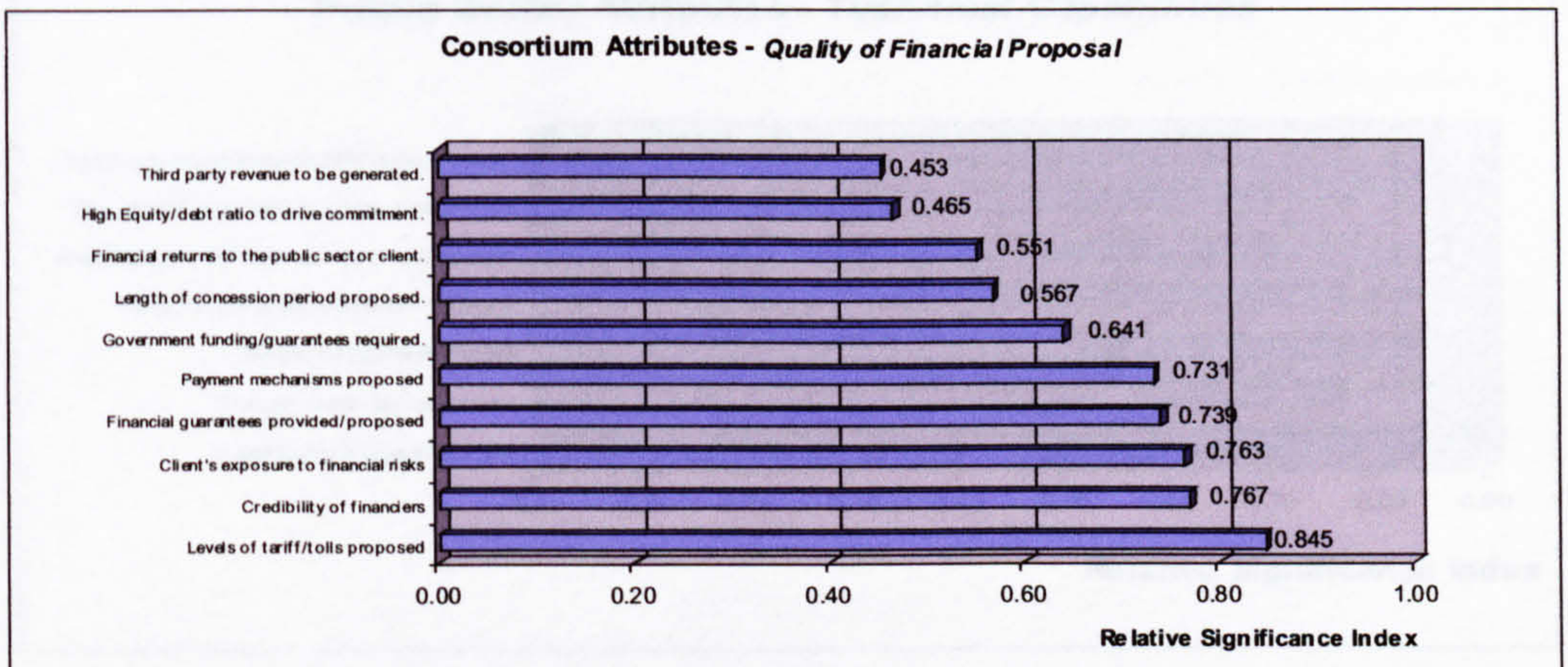
| code | Attributes | *i sub* | *ranking* | *i main* |
|---|---|---|---|---|
| es | ***Socio-Economic*** | | | **0.673** |
| es2 | Maturity of the financial markets. | **0.735** | 1 | |
| es5 | Strong public/private sector relationships. | **0.722** | 2 | |
| es3 | Perceived future economic uncertainties | **0.682** | 3 | |
| es4 | Potential for future equity purchase in PPP pjts | **0.629** | 4 | |
| es1 | Availability of traditional projects. | **0.600** | 5 | |

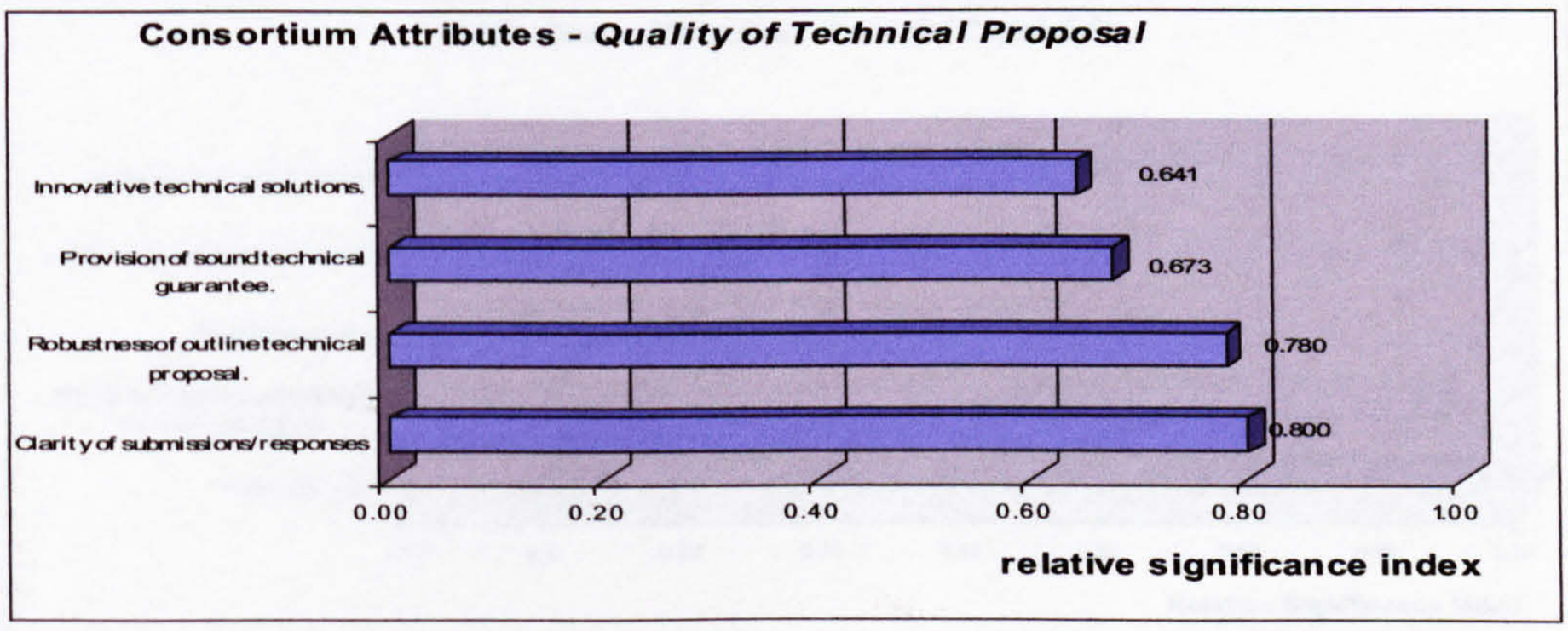
| code | Attributes | *i sub* | *ranking* | *i main* |
|---|---|---|---|---|
| el | ***Political/Legal/Regulatory Regime*** | | | **0.623** |
| el1 | Clearly defined planning and regulatory frameworks. | **0.751** | 1 | |
| el5 | Established institutional and policy frameworks on PPP | **0.747** | 2 | |
| ep1 | Public acceptability of the PPP philosophy. | **0.739** | 3 | |
| ep2 | Stability of the political system. | **0.727** | 4 | |
| ep3 | All-party political support for the philosopy | **0.718** | 5 | |
| el4 | Intellectual property rights. | **0.506** | 6 | |
| el3 | Clear regulations on foreign ownership of property. | **0.400** | 7 | |
| el2 | Ability of foreign investors to repatriate earnings. | **0.396** | 8 | |

# Appendix C.2

## Consortium Attributes

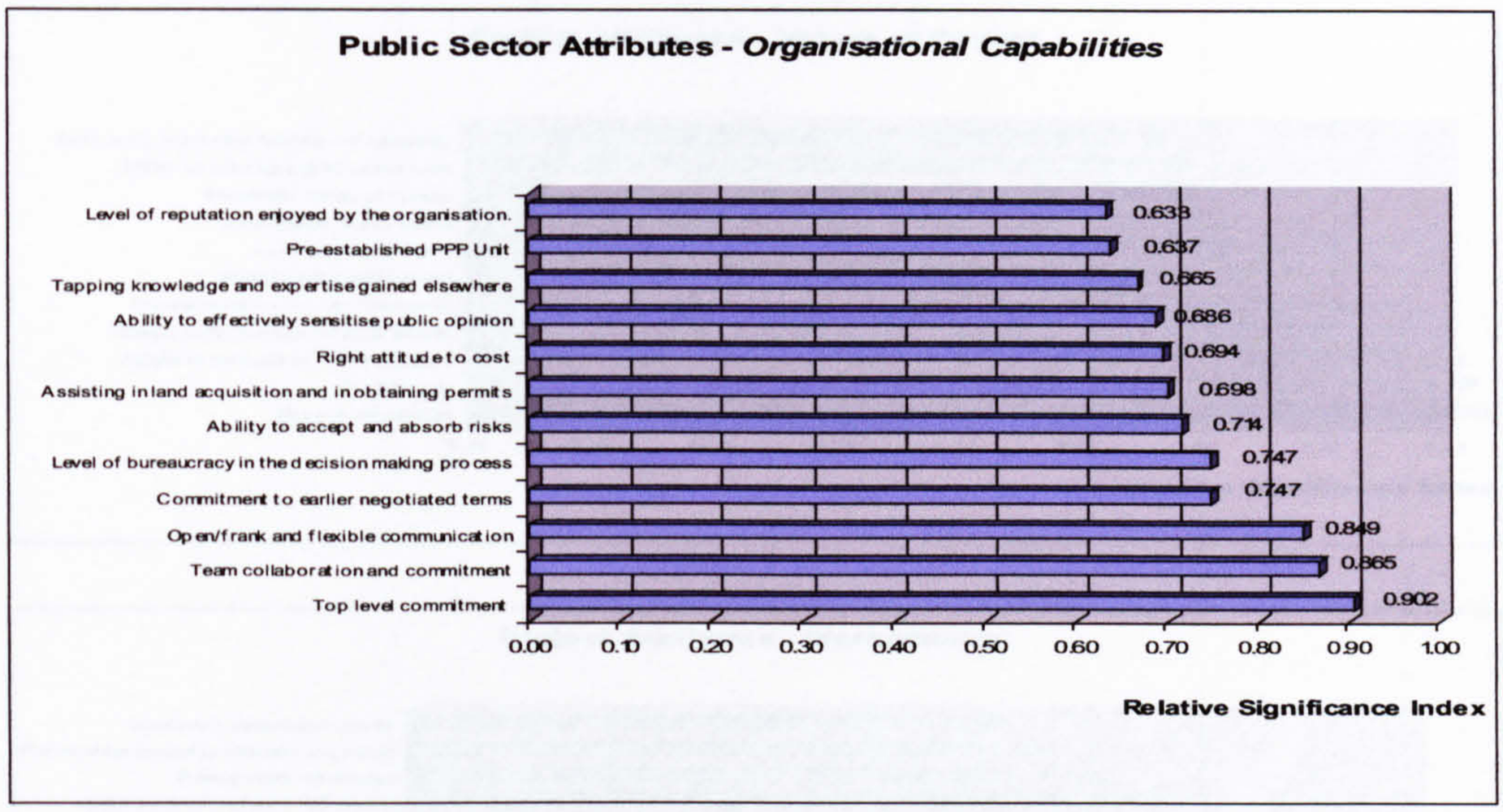


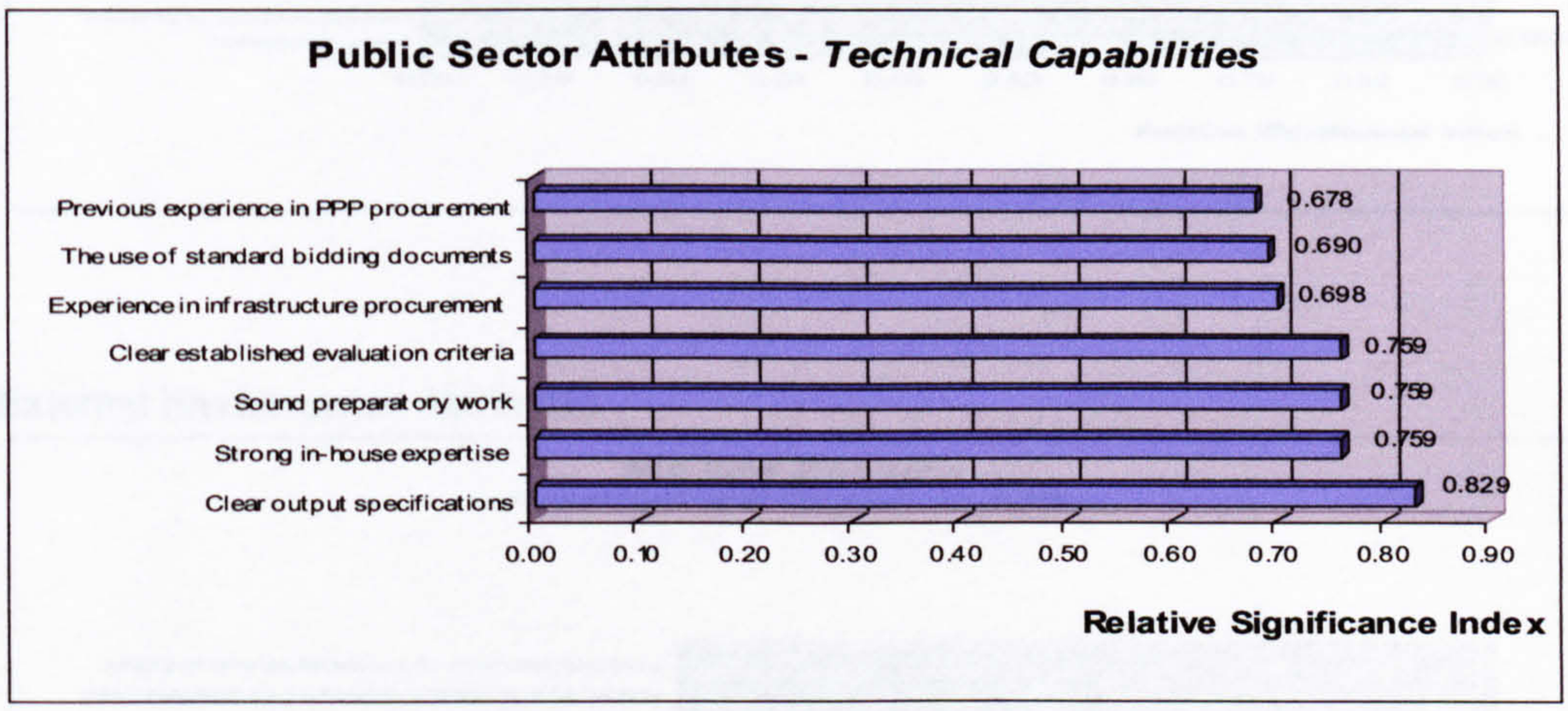



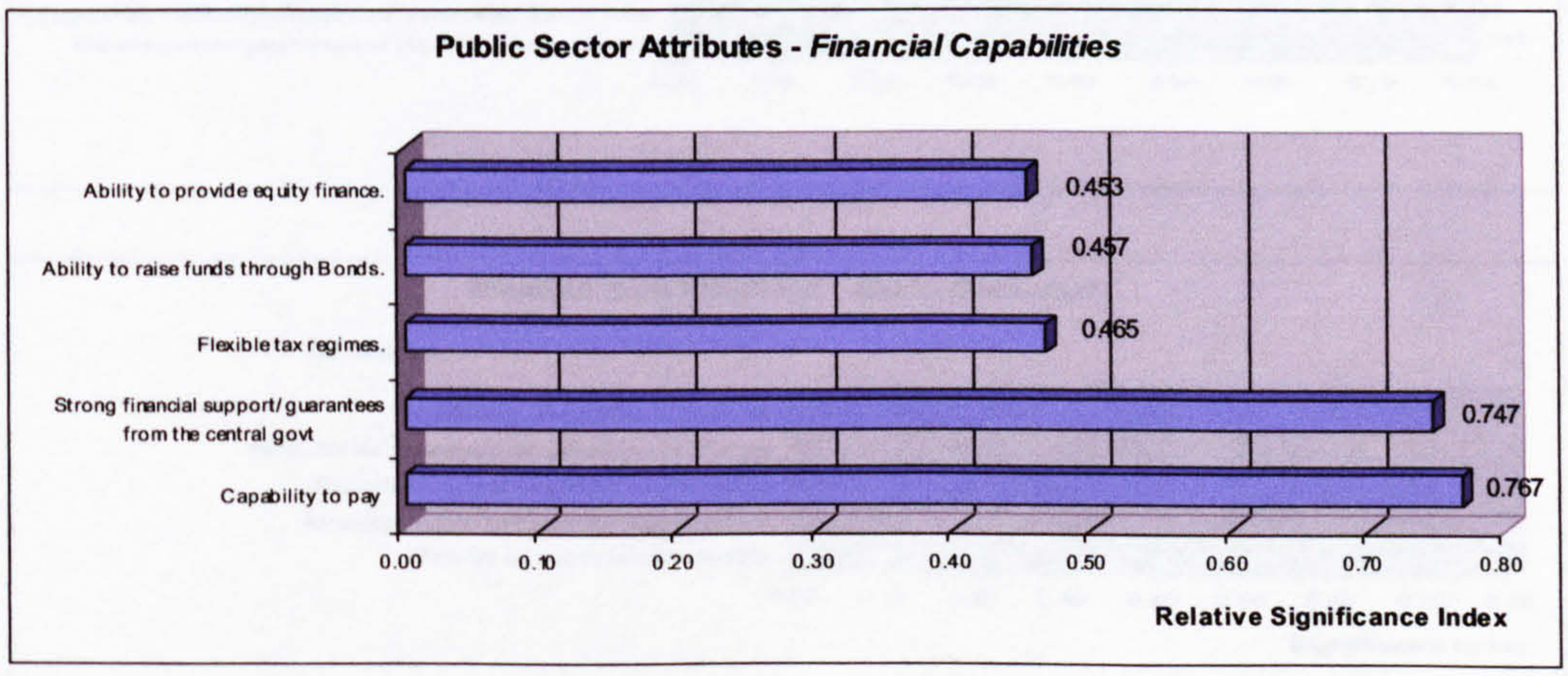



Appendix C.2

# Public Sector Client Attributes

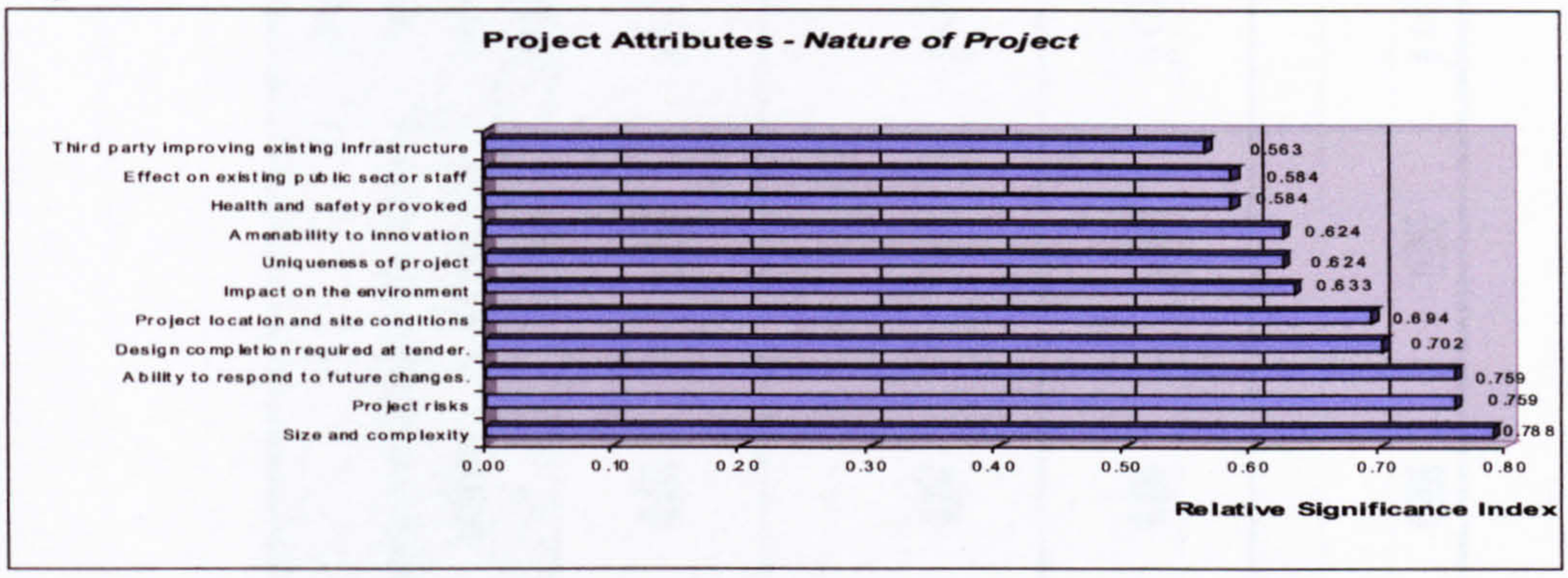


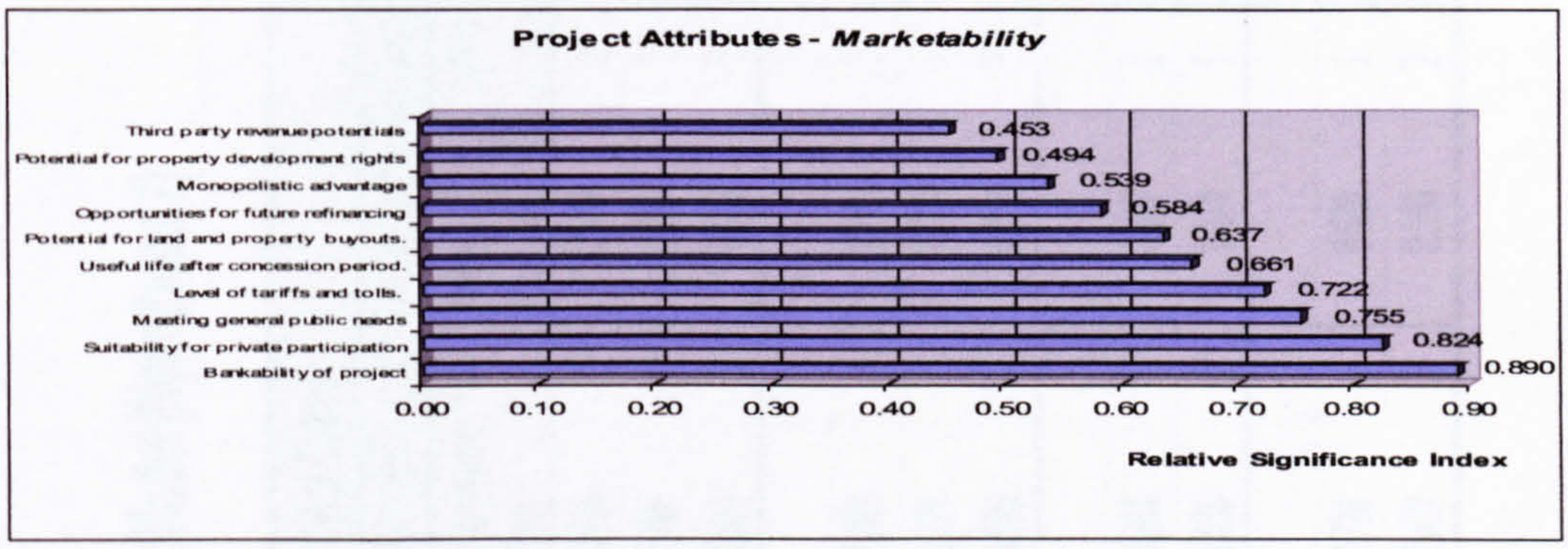



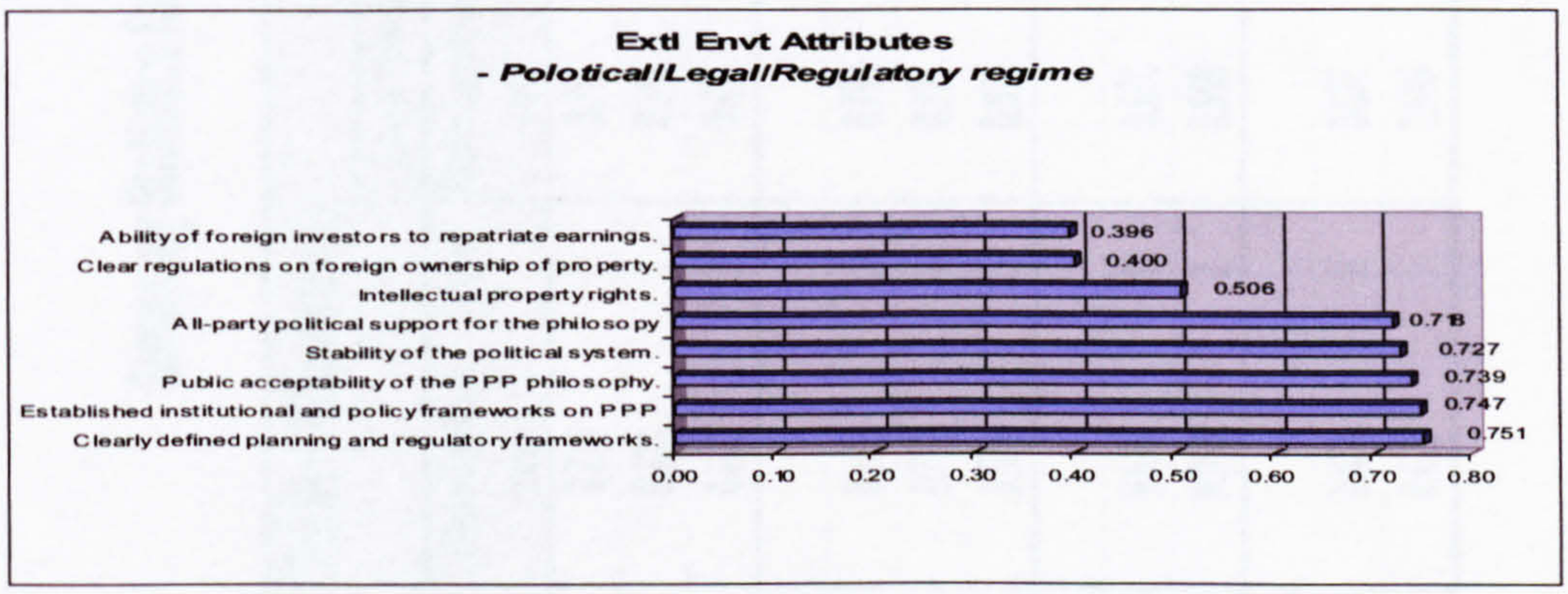
Appendix C.2

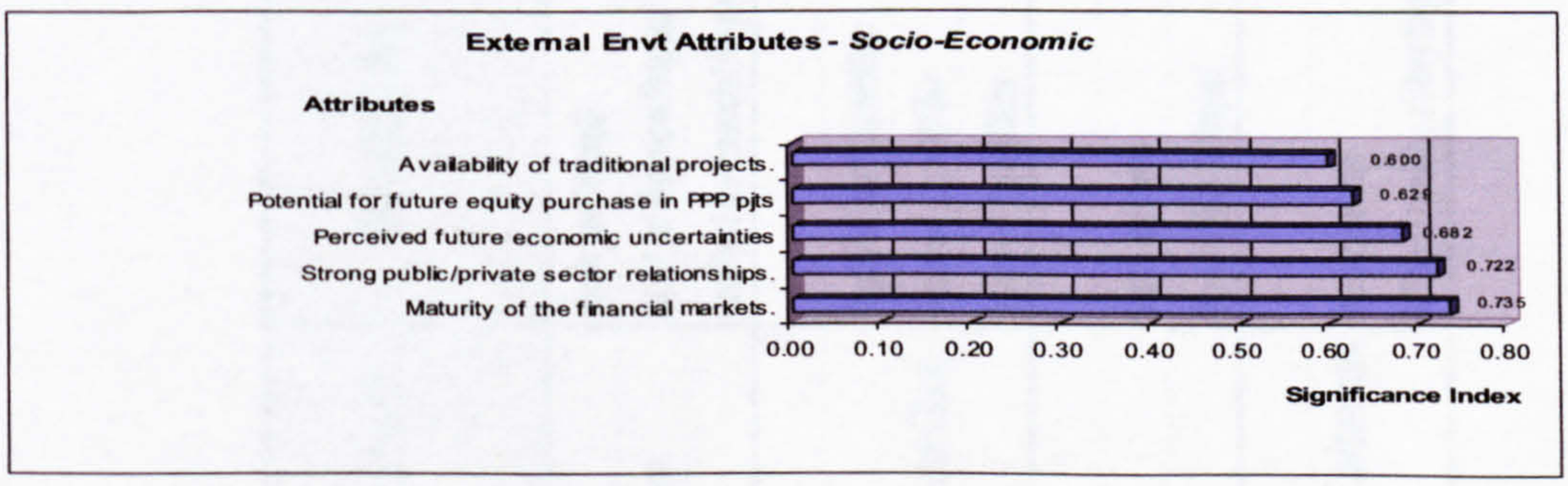
## Project Attributes




## External Environment Attributes



## Appendix C.3 Statistical Computations for Validating the Model

### Summary Statistics for Validating Model (Hypothesis 2)

| Main Components | Main Attributes | The Model Results (n = 49) | | Project Types | | | | | | Spearman's Correlation Coefficient $\sigma$ | Kendall's Coefficient of Concordance $W$ | Statistical test of Significance (one-tail test) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Hospital Projects (n = 14) | | Schools Projects (n = 18) | | Civil Eng'ring Projects (n = 13) | | | | |
| | | Relative Significance Index | Ranking | Relative Significance Index | Ranking | Relative Significance Index | Ranking | Relative Significance Index | Ranking | | | |
| The Consortium | *Nature and Strength* | 0.738 | 1 | 0.757 | 1 | 0.733 | 1 | 0.717 | 2 | **0.875** | *0.906* | $p < 0.001$ |
| | *Quality of Technical Proposal* | 0.723 | 2 | 0.714 | 2 | 0.700 | 2 | 0.765 | 1 | | | |
| | *Quality of the Financial Proposal* | 0.652 | 3 | 0.636 | 3 | 0.593 | 3 | 0.672 | 3 | | | |
| The Public Sector Client | *Organisational Capabilities* | 0.736 | 2 | 0.758 | 1 | 0.707 | 2 | 0.749 | 2 | **0.808** | *0.856* | $p < 0.001$ |
| | *Technical Capabilities* | 0.739 | 1 | 0.727 | 2 | 0.724 | 1 | 0.752 | 1 | | | |
| | *Financial Capabilities* | 0.578 | 3 | 0.606 | 3 | 0.576 | 3 | 0.551 | 3 | | | |
| The Project | *Nature of Project* | 0.665 | 1 | 0.674 | 1 | 0.664 | 1 | 0.657 | 2 | **0.844** | *0.883* | $p < 0.001$ |
| | *Marketability of Project* | 0.656 | 2 | 0.650 | 2 | 0.636 | 2 | 0.674 | 1 | | | |
| The External Environment | *Socio-Economic* | 0.673 | 2 | 0.677 | 1 | 0.720 | 1 | 0.638 | 1 | **0.806** | *0.855* | $p < 0.001$ |
| | *Political/Legal/Regulatory Regime* | 0.623 | 1 | 0.619 | 2 | 0.650 | 2 | 0.590 | 2 | | | |

## General Rating of Consortium Attributes

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| Attributes | project ID | 50 | 49 | 40 | 38 | 33 | 31 | 29 | 19 | 15 | 13 | 12 | 3 | 2 | 1 | 48 | 47 | 46 | 45 | 42 | 41 | 39 | 35 | 34 | 32 | 28 | 27 | 23 | 14 | 9 | 8 | 6 | 5 | 21 | 17 | 11 | 7 | 44 | 37 | 30 | 22 | 20 | 18 | 43 | 36 | 26 | 24 | 16 | 10 | 4 | isub | imain |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondent | pr | pr | pu | pu | pr | pu | pr | pr | pr | pr | pu | pu | pr | pr | pr | pr | pr | pr | pu | pu | pu | pr | pu | pu | pr | pu | pr | pr | pu | pu | pr | pu | pr | pr | pu | pu | pr | pu | pr | pr | pu | pu | pr | pr | pu | pu | pr | pu | | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | off | off | rdt | stl | rdt | rdt | rdt | rdt | rlt | fld | fld | w/s | rlt | w/s | rlt | | |
| | **Nature and Strength** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.738 |
| cs1 | Previous experience in PPP procurement. | 4 | 4 | 5 | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 2 | 5 | 3 | 3 | 5 | 3 | 3 | 5 | 5 | 2 | 4 | 3 | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 5 | 1 | 2 | 5 | 4 | 2 | 2 | 5 | 4 | 5 | 3 | 4 | 3 | 3 | 4 | 5 | 5 | 0.792 | |
| cs2 | Reputation enjoyed by the consortium. | 4 | 4 | 5 | 3 | 4 | 4 | 4 | 5 | 5 | 4 | 4 | 4 | 3 | 3 | 1 | 4 | 4 | 4 | 2 | 3 | 3 | 2 | 1 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 3 | 3 | 5 | 3 | 5 | 3 | 4 | 5 | 5 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 4 | 0.702 |
| cs3 | PPP being a strategic business interest | 4 | 2 | 5 | 4 | 5 | 4 | 5 | 4 | 1 | 4 | 3 | 4 | 3 | 4 | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 1 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 5 | 3 | 3 | 1 | 2 | 5 | 4 | 2 | 5 | 5 | 1 | 4 | 4 | 3 | 3 | 2 | 5 | 1 | 4 | 0.686 |
| cs4 | Ability to tie equity into the project for a long period. | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 3 | 1 | 4 | 3 | 5 | 1 | 3 | 2 | 4 | 4 | 3 | 4 | 3 | 3 | 2 | 3 | 4 | 4 | 2 | 4 | 5 | 4 | 4 | 5 | 2 | 1 | 5 | 4 | 5 | 4 | 3 | 1 | 5 | 5 | 3 | 3 | 4 | 4 | 4 | 4 | 1 | 5 | 0.682 | |
| cs5 | Readiness to accept risk. | 4 | 4 | 3 | 4 | 5 | 5 | 4 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 4 | 3 | 5 | 1 | 5 | 3 | 4 | 4 | 3 | 4 | 4 | 5 | 4 | 3 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 5 | 0.816 |
| cs6 | Open/frank communication during the negotiations. | 5 | 4 | 3 | 4 | 5 | 4 | 5 | 5 | 3 | 3 | 4 | 5 | 3 | 4 | 3 | 5 | 5 | 4 | 5 | 3 | 5 | 5 | 3 | 5 | 3 | 4 | 5 | 5 | 4 | 3 | 5 | 5 | 3 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 4 | 3 | 5 | 3 | 5 | 4 | 4 | 2 | 5 | 0.841 |
| cs7 | Willingness to commit to earlier negotiated terms. | 4 | 3 | 3 | 3 | 5 | 4 | 4 | 3 | 5 | 3 | 3 | 5 | 3 | 4 | 4 | 5 | 5 | 4 | 4 | 3 | 3 | 3 | 5 | 5 | 4 | 5 | 4 | 3 | 3 | 2 | 4 | 4 | 3 | 3 | 5 | 4 | 4 | 5 | 3 | 4 | 5 | 5 | 4 | 3 | 5 | 2 | 4 | 1 | 3 | 2 | 0.751 |
| cs8 | Current job holding of consortium members. | 4 | 3 | 2 | 2 | 4 | 2 | 4 | 3 | 1 | 4 | 3 | 2 | 3 | 3 | 2 | 4 | 4 | 4 | 5 | 3 | 4 | 3 | 4 | 2 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 2 | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 1 | 3 | 1 | 4 | 0.604 | |
| cs9 | Appointing a dedicated bid manager | 5 | 3 | 3 | 3 | 5 | 3 | 4 | 5 | 3 | 4 | 5 | 4 | 4 | 5 | 1 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 3 | 3 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 5 | 4 | 6 | 3 | 5 | 4 | 5 | 4 | 5 | 5 | 0.865 | |
| cs10 | Ability to understand what the public sector wants. | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 1 | 5 | 4 | 4 | 5 | 2 | 4 | 3 | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 3 | 5 | 4 | 4 | 3 | 5 | 3 | 5 | 0.820 | |
| cs11 | Ability of consortium members to work harmoniously. | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 3 | 4 | 4 | 4 | 4 | 5 | 3 | 4 | 4 | 5 | 4 | 4 | 3 | 4 | 2 | 5 | 3 | 3 | 5 | 4 | 4 | 4 | 3 | 3 | 2 | 4 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 2 | 1 | 3 | 3 | 3 | 2 | 4 | 3 | 4 | 0.665 |
| cs12 | Experience of previously working together as a team | 4 | 4 | 3 | 2 | 5 | 4 | 5 | 5 | 4 | 4 | 3 | 2 | 4 | 5 | 1 | 4 | 4 | 4 | 3 | 1 | 1 | 2 | 1 | 5 | 3 | 3 | 5 | 4 | 4 | 3 | 3 | 2 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 2 | 1 | 3 | 3 | 3 | 2 | 4 | 3 | 4 | 0.665 |
| cs13 | Taking proactive role in initiating the project. | 4 | 4 | 2 | 3 | 3 | 1 | 5 | 5 | 1 | 4 | 4 | 4 | 4 | 3 | 3 | 4 | 4 | 4 | 3 | 4 | 3 | 2 | 1 | 4 | 4 | 3 | 4 | 3 | 4 | 4 | 4 | 2 | 3 | 3 | 2 | 4 | 3 | 3 | 5 | 2 | 4 | 3 | 3 | 1 | 2 | 1 | 3 | 1 | 4 | 0.629 | |
| cs14 | Ability to obtain planning permission timeously. | 4 | 3 | 3 | 3 | 5 | 3 | 4 | 4 | 1 | 5 | 4 | 4 | 4 | 3 | 5 | 4 | 4 | 2 | 5 | 2 | 3 | 4 | 1 | 3 | 4 | 5 | 4 | 2 | 4 | 5 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | 3 | 1 | 1 | 1 | 4 | 2 | 4 | 2 | 2 | 5 | 2 | 1 | 4 | 0.657 |
| cs15 | Early involvement of other stakeholders | 5 | 4 | 3 | 3 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 3 | 4 | 4 | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 4 | 5 | 3 | 4 | 5 | 4 | 5 | 3 | 4 | 5 | 3 | 4 | 5 | 4 | 5 | 5 | 3 | 5 | 4 | 4 | 3 | 3 | 4 | 0.833 | |
| cs16 | Personal attributes of the champion within the consortium. | 5 | 3 | 5 | 2 | 3 | 5 | 5 | 5 | 3 | 4 | 3 | 4 | 4 | 5 | 2 | 4 | 4 | 5 | 4 | 3 | 4 | 5 | 5 | 4 | 4 | 3 | 4 | 4 | 3 | 4 | 3 | 4 | 2 | 3 | 4 | 4 | 3 | 5 | 3 | 3 | 5 | 5 | 3 | 3 | 3 | 4 | 3 | 2 | 5 | 3 | 0.755 |
| cs17 | Ability to persevere during protracted negotiations. | 5 | 4 | 3 | 4 | 4 | 4 | 5 | 4 | 3 | 3 | 4 | 5 | 4 | 5 | 2 | 5 | 4 | 5 | 4 | 5 | 3 | 2 | 1 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 3 | 5 | 4 | 5 | 4 | 4 | 4 | 3 | 3 | 0.812 | |
| cs18 | The multidisciplinary nature of consortium team. | 4 | 3 | 4 | 3 | 5 | 2 | 5 | 3 | 3 | 4 | 3 | 4 | 4 | 3 | 2 | 3 | 5 | 2 | 4 | 3 | 2 | 3 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 2 | 4 | 4 | 3 | 3 | 4 | 5 | 3 | 4 | 4 | 5 | 3 | 4 | 3 | 3 | 2 | 3 | 0.669 | |
| cs19 | Experience of previously working with the public sector procurer. | 4 | 2 | 1 | 4 | 2 | 1 | 5 | 5 | 1 | 4 | 2 | 3 | 4 | 3 | 1 | 3 | 4 | 2 | 4 | 1 | 3 | 1 | 1 | 3 | 3 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | 3 | 4 | 5 | 4 | 2 | 2 | 3 | 2 | 4 | 5 | 3 | 4 | 5 | 4 | 3 | 4 | 3 | 0.596 | |
| | | 80 | 65 | 65 | 63 | 84 | 68 | 87 | 81 | 56 | 74 | 69 | 75 | 67 | 73 | 48 | 80 | 80 | 73 | 78 | 65 | 64 | 62 | 47 | 78 | 67 | 71 | 80 | 70 | 73 | 74 | 82 | 62 | 68 | 68 | 66 | 88 | 76 | 66 | 79 | 86 | 66 | 64 | 67 | 58 | 64 | 57 | 73 | 48 | 82 | | |
| | **Quality of the Technical Proposal** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.723 |
| ct1 | Robustness of outline technical proposal. | 4 | 4 | 3 | 3 | 5 | 4 | 4 | 3 | 4 | 4 | 3 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 1 | 5 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 4 | 5 | 5 | 5 | 5 | 4 | 3 | 3 | 5 | 4 | 3 | 5 | 4 | 3 | 0.780 | |
| ct2 | Clarity of submissions and responses to queries | 4 | 3 | 3 | 4 | 5 | 3 | 4 | 4 | 4 | 3 | 3 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 5 | 2 | 2 | 5 | 4 | 4 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 2 | 4 | 5 | 3 | 0.800 | |
| ct3 | Innovative technical solutions | 3 | 3 | 3 | 3 | 5 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 4 | 5 | 3 | 4 | 3 | 3 | 5 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 3 | 2 | 4 | 3 | 4 | 1 | 3 | 3 | 3 | 0.641 | |
| ct4 | Provision of sound technical guarantees. | 4 | 3 | 1 | 2 | 4 | 2 | 4 | 3 | 4 | 3 | 4 | 5 | 3 | 5 | 3 | 4 | 3 | 3 | 2 | 4 | 1 | 1 | 2 | 4 | 4 | 3 | 4 | 5 | 4 | 4 | 3 | 2 | 4 | 5 | 3 | 5 | 4 | 4 | 3 | 5 | 5 | 3 | 4 | 4 | 1 | 3 | 4 | 3 | 3 | 0.673 | |
| | | 15 | 13 | 10 | 12 | 19 | 12 | 15 | 14 | 16 | 13 | 13 | 16 | 14 | 18 | 15 | 16 | 14 | 15 | 12 | 14 | 7 | 5 | 13 | 16 | 17 | 15 | 17 | 17 | 15 | 17 | 14 | 13 | 15 | 16 | 11 | 16 | 18 | 16 | 20 | 20 | 14 | 14 | 15 | 16 | 16 | 7 | 15 | 16 | 12 | | |
| | **Quality of the Financial Proposal** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.652 |
| cf1 | Level of financial guarantees provided/proposed by the consortium. | 4 | 3 | 4 | 4 | 4 | 2 | 3 | 4 | 3 | 3 | 3 | 5 | 3 | 3 | 4 | 4 | 4 | 3 | 2 | 3 | 2 | 1 | 5 | 4 | 3 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 5 | 5 | 2 | 4 | 4 | 4 | 5 | 5 | 4 | 3 | 3 | 4 | 4 | 2 | 4 | 4 | 4 | 0.739 | |
| cf2 | Payment mechanisms proposed | 5 | 3 | 4 | 4 | 5 | 3 | 4 | 4 | 3 | 3 | 4 | 4 | 4 | 3 | 4 | 4 | 2 | 3 | 2 | 5 | 1 | 1 | 5 | 5 | 3 | 4 | 4 | 5 | 3 | 5 | 4 | 3 | 4 | 3 | 2 | 4 | 4 | 3 | 5 | 5 | 2 | 5 | 5 | 4 | 4 | 1 | 4 | 4 | 4 | 0.731 | |
| cf3 | Level of government funding/guarantees required by the consortium. | 4 | 3 | 4 | 3 | 5 | 4 | 4 | 3 | 1 | 3 | 3 | 2 | 3 | 3 | 3 | 4 | 3 | 4 | 2 | 5 | 1 | 1 | 3 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 4 | 2 | 4 | 4 | 3 | 5 | 4 | 2 | 2 | 1 | 4 | 2 | 4 | 4 | 2 | 2 | 1 | 3 | 4 | 0.641 | |
| cf4 | Levels of tariff/tolls proposed | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 4 | 5 | 4 | 3 | 4 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 3 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 2 | 5 | 5 | 4 | 5 | 5 | 3 | 5 | 5 | 5 | 4 | 4 | 0.845 | |
| cf5 | Credibility of financiers | 3 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 3 | 4 | 3 | 3 | 4 | 5 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 5 | 3 | 4 | 5 | 4 | 4 | 3 | 3 | 3 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 3 | 3 | 5 | 3 | 3 | 3 | 5 | 4 | 4 | 0.767 | |
| cf6 | Level of exposure of the public sector organisation to financial risks | 4 | 4 | 4 | 4 | 3 | 5 | 4 | 4 | 5 | 3 | 4 | 5 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 1 | 3 | 5 | 5 | 3 | 4 | 4 | 5 | 4 | 3 | 3 | 4 | 3 | 3 | 4 | 5 | 5 | 3 | 1 | 5 | 4 | 4 | 4 | 4 | 3 | 1 | 5 | 5 | 4 | 0.763 | |
| cf7 | Level of financial returns to the public sector organisation. | 3 | 3 | 4 | 4 | 3 | 1 | 2 | 3 | 1 | 3 | 4 | 4 | 1 | 3 | 3 | 3 | 2 | 5 | 1 | 3 | 1 | 1 | 1 | 3 | 4 | 2 | 5 | 4 | 4 | 1 | 3 | 1 | 2 | 5 | 3 | 5 | 4 | 3 | 1 | 5 | 2 | 3 | 4 | 1 | 2 | 1 | 3 | 1 | 4 | 0.551 | |
| cf8 | Length of concession period proposed. | 4 | 2 | 3 | 4 | 3 | 3 | 1 | 3 | 3 | 4 | 3 | 2 | 3 | 3 | 3 | 4 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 3 | 3 | 2 | 4 | 3 | 3 | 2 | 3 | 1 | 2 | 3 | 4 | 5 | 4 | 3 | 5 | 5 | 2 | 2 | 4 | 3 | 3 | 1 | 4 | 1 | 4 | 0.567 | |
| cf9 | Level of third party revenue to be generated. | 3 | 2 | 3 | 3 | 3 | 1 | 1 | 2 | 1 | 4 | 2 | 2 | 1 | 2 | 2 | 4 | 1 | 3 | 1 | 2 | 1 | 1 | 1 | 3 | 2 | 2 | 4 | 3 | 3 | 1 | 2 | 1 | 2 | 5 | 4 | 2 | 2 | 2 | 5 | 5 | 1 | 2 | 3 | 2 | 1 | 1 | 2 | 2 | 3 | 0.453 | |
| cf10 | High Equity/debt ratio so as to drive commitment. | 3 | 3 | 1 | 3 | 3 | 2 | 1 | 2 | 1 | 3 | 2 | 3 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 | 3 | 1 | 4 | 3 | 2 | 4 | 1 | 3 | 4 | 2 | 2 | 1 | 3 | 3 | 3 | 3 | 1 | 4 | 1 | 2 | 2 | 4 | 4 | 2 | 1 | 3 | 1 | 3 | 0.465 | |
| | | 37 | 31 | 35 | 37 | 37 | 30 | 26 | 33 | 26 | 33 | 31 | 35 | 25 | 29 | 33 | 38 | 27 | 35 | 26 | 34 | 17 | 19 | 30 | 41 | 31 | 33 | 43 | 38 | 35 | 30 | 32 | 25 | 33 | 40 | 33 | 43 | 40 | 28 | 39 | 46 | 27 | 34 | 41 | 32 | 27 | 17 | 39 | 29 | 38 | | |

***Notes***

$$(i_{sub}) = \sum_{i=1}^{n} r/(r^* x n)$$

$$(i_{main}) = \sum_{i=1}^{n} r/(r^* x n x N)$$

where $(i_{sub})$ = the relative significance index for the sub-attributes;
$(i_{main})$ = the relative significance index for the main attributes;
r = the degree of significance assigned by each respondent to the $i$th attribute;
$r^*$ = the ideal or anchor score i.e. highest score (5 in this case);
n = the number of responses;
N = the total number of sub-attributes under each main attribute

pr = private
pu = public
hlth = health
sch = school
off = offices
rdt = road transport
fld = flood defence
w/s = water and sewerage
rlt = rail transport

## General Rating of Consortium Attributes - Civil Eng Projects

**Project Type: Roads, Rail, Flood Defences, Waste Water and Sanitation Treatment,and Bridges**

| | | project ID | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | project ID | 44 | 37 | 30 | 22 | 20 | 18 | 43 | 36 | 26 | 24 | 16 | 10 | 4 | |
| | | respondent | pr | pu | pr | pr | pu | pu | pu | pr | pr | pu | pu | pr | pu | |
| | | project type | rdt | stl | rdt | rdt | rdt/l | rdt | rlt | fld | fld | w/s | rlt | w/s | rlt | |
| | **Attributes** | | | | | | | | | | | | | | | **lsub** / **lmain** |
| | **Nature and Strength** | | | | | | | | | | | | | | | **0.717** |
| cs1 | Previous experience in PPP procurement. | | 4 | 2 | 2 | 5 | 4 | 5 | 3 | 4 | 3 | 3 | 4 | 5 | 5 | 0.754 |
| cs2 | Reputation enjoyed by the consortium. | | 3 | 4 | 5 | 5 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 4 | 0.631 |
| cs3 | PPP being a strategic business interest | | 4 | 2 | 5 | 5 | 1 | 4 | 4 | 3 | 3 | 2 | 5 | 1 | 4 | 0.662 |
| cs4 | Ability to tie equity into the project for a long period. | | 4 | 3 | 1 | 5 | 5 | 3 | 3 | 4 | 4 | 4 | 4 | 1 | 5 | 0.708 |
| cs5 | Readiness to accept risk. | | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 5 | 0.938 |
| cs6 | Open/frank communication during the negotiations. | | 4 | 5 | 5 | 5 | 4 | 3 | 5 | 3 | 5 | 4 | 4 | 2 | 5 | 0.831 |
| cs7 | Willingness to commit to earlier negotiated terms. | | 3 | 4 | 5 | 5 | 4 | 3 | 5 | 2 | 4 | 1 | 3 | 2 | 5 | 0.708 |
| cs8 | Current job holding of consortium members. | | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 1 | 3 | 1 | 4 | 0.523 |
| cs9 | Appointing a dedicated bid manager | | 4 | 4 | 5 | 5 | 4 | 6 | 3 | 5 | 4 | 5 | 4 | 5 | 5 | 0.908 |
| cs10 | Ability to understand what the public sector wants. | | 5 | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 5 | 1 | 4 | 0.831 |
| cs11 | Ability of consortium members to work harmoniously. | | 4 | 4 | 5 | 5 | 5 | 3 | 5 | 4 | 4 | 3 | 5 | 3 | 5 | 0.846 |
| cs12 | Experience of previously working together as a team | | 4 | 4 | 5 | 5 | 2 | 1 | 3 | 3 | 3 | 2 | 4 | 3 | 4 | 0.662 |
| cs13 | Taking proactive role in initiating the project. | | 3 | 3 | 5 | 2 | 4 | 3 | 3 | 1 | 2 | 1 | 3 | 1 | 4 | 0.538 |
| cs14 | Ability to obtain planning permission timeously. | | 3 | 1 | 1 | 1 | 4 | 2 | 4 | 2 | 2 | 5 | 2 | 1 | 4 | 0.492 |
| cs15 | Early involvement of other stakeholders | | 4 | 4 | 5 | 5 | 3 | 5 | 4 | 2 | 3 | 3 | 4 | 3 | 4 | 0.754 |
| cs16 | Personal attributes of the champion within the consortium. | | 3 | 3 | 5 | 5 | 3 | 3 | 3 | 4 | 3 | 2 | 5 | 3 | 5 | 0.723 |
| cs17 | Ability to persevere during protracted negotiations. | | 5 | 4 | 4 | 5 | 3 | 5 | 4 | 5 | 4 | 4 | 4 | 3 | 3 | 0.815 |
| cs18 | The multidisciplinary nature of consortium team. | | 5 | 3 | 4 | 5 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 0.646 |
| cs19 | Experience of previously working with the public sector procurer. | | 5 | 3 | 4 | 5 | 4 | 1 | 2 | 1 | 4 | 3 | 4 | 3 | 4 | 0.662 |
| | | | 76 | 66 | 79 | 86 | 66 | 64 | 67 | 58 | 64 | 57 | 73 | 48 | 82 | |
| | **Quality of Technical Proposal** | | | | | | | | | | | | | | | **0.765** |
| ct1 | Robustness of outline technical proposal. | | 5 | 5 | 5 | 5 | 4 | 3 | 3 | 5 | 4 | 3 | 5 | 4 | 3 | 0.831 |
| ct2 | Clarity of submissions and responses to queries | | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 2 | 4 | 5 | 3 | 0.846 |
| ct3 | Innovative technical solutions. | | 4 | 4 | 5 | 5 | 3 | 2 | 4 | 3 | 4 | 1 | 3 | 3 | 3 | 0.677 |
| ct4 | Provision of sound technical guarantee. | | 4 | 3 | 5 | 5 | 3 | 4 | 3 | 4 | 4 | 1 | 3 | 4 | 3 | 0.708 |
| | | | 18 | 16 | 20 | 20 | 14 | 14 | 15 | 16 | 16 | 7 | 15 | 16 | 12 | |
| | **Quality of the Financial Proposal** | | | | | | | | | | | | | | | **0.672** |
| cf1 | Level of financial guarantees provided/proposed by the consortium. | | 4 | 4 | 5 | 5 | 4 | 3 | 3 | 4 | 4 | 2 | 4 | 4 | 4 | 0.769 |
| cf2 | Payment mechanisms proposed | | 4 | 3 | 5 | 5 | 2 | 5 | 5 | 4 | 4 | 1 | 4 | 4 | 4 | 0.769 |
| cf3 | Level of government funding/guarantees required by the consortium. | | 4 | 2 | 3 | 5 | 3 | 5 | 4 | 2 | 2 | 1 | 4 | 2 | 4 | 0.631 |
| cf4 | Levels of tariff/tolls proposed | | 5 | 2 | 5 | 5 | 4 | 5 | 5 | 5 | 3 | 5 | 5 | 5 | 4 | 0.892 |
| cf5 | Credibility of financiers | | 5 | 5 | 5 | 5 | 3 | 3 | 5 | 3 | 3 | 3 | 5 | 4 | 4 | 0.815 |
| cf6 | Level of exposure of the public sector organisation to financial risks | | 5 | 3 | 1 | 5 | 4 | 4 | 4 | 4 | 3 | 1 | 5 | 5 | 4 | 0.738 |
| cf7 | Level of financial returns to the public sector organisation. | | 4 | 3 | 1 | 5 | 2 | 3 | 4 | 1 | 2 | 1 | 3 | 1 | 4 | 0.523 |
| cf8 | Length of concession period proposed. | | 4 | 3 | 5 | 5 | 2 | 2 | 4 | 3 | 3 | 1 | 4 | 1 | 4 | 0.631 |
| cf9 | Level of third party revenue to be generated. | | 2 | 2 | 5 | 5 | 1 | 2 | 3 | 2 | 1 | 1 | 2 | 2 | 3 | 0.477 |
| cf10 | High Equity/debt ratio so as to drive commitment. | | 3 | 1 | 4 | 1 | 2 | 2 | 4 | 4 | 2 | 1 | 3 | 1 | 3 | 0.477 |
| | | | 40 | 28 | 39 | 46 | 27 | 34 | 41 | 32 | 27 | 17 | 39 | 29 | 38 | |

## General Rating of Consortium Attributes

**Project Type: Hospitals**

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | project ID | 50 | 49 | 40 | 38 | 33 | 31 | 29 | 19 | 15 | 13 | 12 | 3 | 2 | 1 | | | |
| | respondent | pr | pr | pu | pu | pr | pu | pr | pr | pr | pr | pu | pu | pr | pr | | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | | | |
| | **Attributes** | | | | | | | | | | | | | | | | **isub** | **imain** |
| | **Nature and Strength** | | | | | | | | | | | | | | | | | **0.757** |
| cs1 | Previous experience in PPP procurement. | 4 | 4 | 5 | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 2 | 5 | 3 | | 0.857 | |
| cs2 | Reputation enjoyed by the consortium. | 4 | 4 | 5 | 3 | 4 | 4 | 4 | 5 | 5 | 4 | 4 | 4 | 3 | 3 | | 0.800 | |
| cs3 | PPP being a strategic business interest | 4 | 2 | 5 | 4 | 5 | 4 | 5 | 4 | 1 | 4 | 3 | 4 | 3 | 4 | | 0.743 | |
| cs4 | Ability to tie equity into the project for a long period. | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 3 | 1 | 4 | 3 | 5 | 1 | 3 | | 0.629 | |
| cs5 | Readiness to accept risk. | 4 | 4 | 3 | 4 | 5 | 5 | 4 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | | 0.757 | |
| cs6 | Open/frank communication during the negotiations. | 5 | 4 | 3 | 4 | 5 | 4 | 5 | 5 | 3 | 3 | 4 | 5 | 3 | 4 | | 0.814 | |
| cs7 | Willingness to commit to earlier negotiated terms. | 4 | 3 | 3 | 3 | 5 | 4 | 4 | 3 | 5 | 3 | 3 | 5 | 3 | 4 | | 0.743 | |
| cs8 | Current job holding of consortium members. | 4 | 3 | 2 | 2 | 4 | 2 | 4 | 3 | 1 | 4 | 3 | 2 | 3 | 3 | | 0.571 | |
| cs9 | Appointing a dedicated bid manager | 5 | 3 | 3 | 3 | 5 | 3 | 4 | 5 | 3 | 4 | 5 | 4 | 4 | 5 | | 0.800 | |
| cs10 | Ability to understand what the public sector wants. | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | | 0.914 | |
| cs11 | Ability of consortium members to work harmoniously. | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 3 | 4 | 4 | 4 | 4 | 5 | | 0.843 | |
| cs12 | Experience of previously working together as a team | 4 | 4 | 3 | 2 | 5 | 4 | 5 | 5 | 4 | 4 | 3 | 2 | 4 | 5 | | 0.771 | |
| cs13 | Taking proactive role in initiating the project. | 4 | 4 | 2 | 3 | 3 | 1 | 5 | 5 | 1 | 4 | 4 | 4 | 4 | 3 | | 0.671 | |
| cs14 | Ability to obtain planning permission timeously. | 4 | 3 | 3 | 3 | 5 | 3 | 4 | 4 | 1 | 5 | 4 | 4 | 4 | 3 | | 0.714 | |
| cs15 | Early involvement of other stakeholders | 5 | 4 | 3 | 3 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 3 | 4 | | 0.843 | |
| cs16 | Personal attributes of the champion within the consortium. | 5 | 3 | 5 | 2 | 3 | 5 | 5 | 5 | 3 | 4 | 3 | 4 | 4 | 5 | | 0.800 | |
| cs17 | Ability to persevere during protracted negotiations. | 5 | 4 | 3 | 4 | 4 | 4 | 5 | 4 | 3 | 3 | 4 | 5 | 4 | 5 | | 0.814 | |
| cs18 | The multidisciplinary nature of consortium team. | 4 | 3 | 4 | 3 | 5 | 2 | 5 | 3 | 3 | 4 | 3 | 4 | 4 | 3 | | 0.714 | |
| cs19 | Experience of previously working with the public sector procurer. | 4 | 2 | 1 | 4 | 2 | 1 | 5 | 5 | 1 | 4 | 2 | 3 | 4 | 3 | | 0.586 | |
| | | 80 | 65 | 65 | 63 | 84 | 68 | 87 | 81 | 56 | 74 | 69 | 75 | 67 | 73 | | | |
| | **Quality of Technical Proposal** | | | | | | | | | | | | | | | | | **0.714** |
| ct1 | Robustness of outline technical proposal. | 4 | 4 | 3 | 3 | 5 | 4 | 4 | 3 | 4 | 4 | 3 | 4 | 4 | 5 | | 0.771 | |
| ct2 | Clarity of submissions and responses to queries | 4 | 3 | 3 | 4 | 5 | 3 | 4 | 4 | 4 | 3 | 3 | 4 | 4 | 5 | | 0.757 | |
| ct3 | Innovative technical solutions. | 3 | 3 | 3 | 3 | 5 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | | 0.657 | |
| ct4 | Provision of sound technical guarantee. | 4 | 3 | 1 | 2 | 4 | 2 | 4 | 3 | 4 | 3 | 4 | 5 | 3 | 5 | | 0.671 | |
| | | 15 | 13 | 10 | 12 | 19 | 12 | 15 | 14 | 16 | 13 | 13 | 16 | 14 | 18 | | | |
| | **Quality of the Financial Proposal** | | | | | | | | | | | | | | | | | **0.636** |
| cf1 | Level of financial guarantees provided/proposed by the consortium. | 4 | 3 | 4 | 4 | 4 | 2 | 3 | 4 | 3 | 3 | 3 | 5 | 3 | 3 | | 0.686 | |
| cf2 | Payment mechanisms proposed | 5 | 3 | 4 | 4 | 5 | 3 | 4 | 4 | 3 | 3 | 4 | 4 | 4 | 3 | | 0.757 | |
| cf3 | Level of government funding/guarantees required by the consortium. | 4 | 3 | 4 | 3 | 5 | 4 | 4 | 3 | 1 | 3 | 3 | 2 | 3 | 3 | | 0.643 | |
| cf4 | Levels of tariff/tolls proposed | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 4 | 5 | 4 | 3 | 4 | 3 | 3 | | 0.743 | |
| cf5 | Credibility of financiers | 3 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 3 | 4 | 3 | 3 | | 0.729 | |
| cf6 | Level of exposure of the public sector organisation to financial risks | 4 | 4 | 4 | 4 | 3 | 5 | 4 | 4 | 5 | 3 | 4 | 5 | 3 | 4 | | 0.800 | |
| cf7 | Level of financial returns to the public sector organisation. | 3 | 3 | 4 | 4 | 3 | 1 | 2 | 3 | 1 | 3 | 4 | 4 | 1 | 3 | | 0.557 | |
| cf8 | Length of concession period proposed. | 4 | 2 | 3 | 4 | 3 | 3 | 1 | 3 | 3 | 4 | 3 | 2 | 3 | 3 | | 0.586 | |
| cf9 | Level of third party revenue to be generated. | 3 | 2 | 3 | 3 | 3 | 1 | 1 | 2 | 1 | 4 | 2 | 2 | 1 | 2 | | 0.429 | |
| cf10 | High Equity/debt ratio so as to drive commitment. | 3 | 3 | 1 | 3 | 3 | 2 | 1 | 2 | 1 | 3 | 2 | 3 | 1 | 2 | | 0.429 | |
| | | 37 | 31 | 35 | 37 | 37 | 30 | 26 | 33 | 26 | 33 | 31 | 35 | 25 | 29 | | | |

## General Rating of Consortium Attributes

**Project Type: Schools**

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | project ID | 48 | 47 | 46 | 45 | 42 | 41 | 39 | 35 | 34 | 32 | 28 | 27 | 23 | 14 | 9 | 8 | 6 | 5 | | | | |
| | respondent | pr | pr | pr | pr | pu | pu | pu | pr | pu | pu | pr | pu | pr | pr | pu | pu | pr | pu | | | | |
| | project type | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | | | | |
| | **Attributes** | | | | | | | | | | | | | | | | | | | | **Isub** | **Imain** | |
| | **Nature and Strength** | | | | | | | | | | | | | | | | | | | | | | **0.733** |
| cs1 | Previous experience in PPP procurement. | 3 | 5 | 3 | 3 | 5 | 5 | 2 | 4 | 3 | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | | 0.800 | | |
| cs2 | Reputation enjoyed by the consortium. | 1 | 4 | 4 | 4 | 2 | 3 | 3 | 2 | 1 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 3 | | 0.656 | | |
| cs3 | PPP being a strategic business interest | 2 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 1 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 3 | | 0.689 | | |
| cs4 | Ability to tie equity into the project for a long period. | 2 | 4 | 4 | 3 | 4 | 3 | 3 | 2 | 3 | 4 | 4 | 2 | 4 | 5 | 4 | 4 | 5 | 2 | | 0.689 | | |
| cs5 | Readiness to accept risk. | 3 | 4 | 4 | 4 | 5 | 4 | 3 | 5 | 1 | 5 | 3 | 4 | 4 | 3 | 4 | 4 | 5 | 4 | | 0.767 | | |
| cs6 | Open/frank communication during the negotiations. | 3 | 5 | 5 | 4 | 5 | 3 | 5 | 5 | 3 | 5 | 3 | 4 | 5 | 5 | 4 | 3 | 5 | 5 | | 0.856 | | |
| cs7 | Willingness to commit to earlier negotiated terms. | 4 | 5 | 5 | 4 | 4 | 3 | 3 | 3 | 5 | 5 | 4 | 5 | 4 | 3 | 3 | 2 | 4 | 4 | | 0.778 | | |
| cs8 | Current job holding of consortium members. | 2 | 4 | 4 | 4 | 5 | 3 | 4 | 3 | 4 | 2 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 2 | | 0.667 | | |
| cs9 | Appointing a dedicated bid manager | 1 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 3 | 3 | 5 | 5 | 5 | | 0.867 | | |
| cs10 | Ability to understand what the public sector wants. | 4 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 1 | 5 | 4 | 4 | 5 | 2 | 4 | 3 | 5 | 4 | | 0.811 | | |
| cs11 | Ability of consortium members to work harmoniously. | 3 | 4 | 4 | 5 | 4 | 4 | 3 | 4 | 2 | 5 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 4 | | 0.767 | | |
| cs12 | Experience of previously working together as a team | 1 | 4 | 4 | 4 | 3 | 1 | 1 | 2 | 1 | 5 | 3 | 3 | 5 | 4 | 4 | 3 | 3 | 2 | | 0.589 | | |
| cs13 | Taking proactive role in initiating the project. | 3 | 4 | 4 | 4 | 3 | 4 | 3 | 2 | 1 | 4 | 4 | 3 | 4 | 3 | 4 | 4 | 4 | 2 | | 0.667 | | |
| cs14 | Ability to obtain planning permission timeously. | 5 | 4 | 4 | 2 | 5 | 2 | 3 | 4 | 1 | 3 | 4 | 5 | 4 | 2 | 4 | 5 | 3 | 4 | | 0.711 | | |
| cs15 | Early involvement of other stakeholders | 4 | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 4 | 5 | 3 | 4 | 5 | 4 | | 0.878 | | |
| cs16 | Personal attributes of the champion within the consortium. | 2 | 4 | 4 | 5 | 4 | 3 | 4 | 5 | 5 | 4 | 3 | 4 | 4 | 3 | 4 | 3 | 4 | 2 | | 0.744 | | |
| cs17 | Ability to persevere during protracted negotiations. | 2 | 5 | 4 | 5 | 4 | 5 | 3 | 2 | 1 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 4 | 4 | | 0.789 | | |
| cs18 | The multidisciplinary nature of consortium team. | 2 | 3 | 5 | 2 | 4 | 3 | 2 | 3 | 3 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 2 | | 0.644 | | |
| cs19 | Experience of previously working with the public sector procurer. | 1 | 3 | 4 | 2 | 4 | 1 | 3 | 1 | 1 | 3 | 3 | 3 | 4 | 3 | 4 | 5 | 4 | 2 | | 0.567 | | |
| | | 48 | 80 | 80 | 73 | 78 | 65 | 64 | 62 | 47 | 78 | 67 | 71 | 80 | 70 | 73 | 74 | 82 | 62 | | | | |
| | **Quality of Technical Proposal** | | | | | | | | | | | | | | | | | | | | | | **0.700** |
| ct1 | Robustness of outline technical proposal. | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 1 | 5 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | | 0.767 | | |
| ct2 | Clarity of submissions and responses to queries | 4 | 4 | 4 | 5 | 4 | 5 | 2 | 2 | 5 | 4 | 4 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | | 0.811 | | |
| ct3 | Innovative technical solutions. | 4 | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 4 | 5 | 3 | 4 | 3 | 3 | 5 | 3 | 3 | | 0.600 | | |
| ct4 | Provision of sound technical guarantee. | 3 | 4 | 3 | 3 | 2 | 4 | 1 | 1 | 2 | 4 | 4 | 3 | 4 | 5 | 4 | 4 | 3 | 2 | | 0.622 | | |
| | | 15 | 16 | 14 | 15 | 12 | 14 | 7 | 5 | 13 | 16 | 17 | 15 | 17 | 17 | 15 | 17 | 14 | 13 | | | | |
| | **Quality of the Financial Proposal** | | | | | | | | | | | | | | | | | | | | | | **0.593** |
| cf1 | Level of financial guarantees provided/proposed by the consortium. | 4 | 4 | 4 | 3 | 2 | 3 | 2 | 1 | 5 | 4 | 3 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | | 0.744 | | |
| cf2 | Payment mechanisms proposed | 4 | 4 | 2 | 3 | 2 | 5 | 1 | 1 | 5 | 5 | 3 | 4 | 4 | 5 | 3 | 5 | 4 | 3 | | 0.700 | | |
| cf3 | Level of government funding/guarantees required by the consortium. | 3 | 4 | 3 | 4 | 2 | 5 | 1 | 1 | 3 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 4 | 2 | | 0.622 | | |
| cf4 | Levels of tariff/tolls proposed | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 3 | 4 | 4 | | 0.867 | | |
| cf5 | Credibility of financiers | 4 | 5 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 5 | 3 | 4 | 5 | 4 | 4 | 3 | 3 | 3 | | 0.722 | | |
| cf6 | Level of exposure of the public sector organisation to financial risks | 4 | 4 | 4 | 4 | 4 | 4 | 1 | 3 | 5 | 5 | 3 | 4 | 4 | 5 | 4 | 3 | 3 | 4 | | 0.756 | | |
| cf7 | Level of financial returns to the public sector organisation. | 3 | 3 | 2 | 5 | 1 | 3 | 1 | 1 | 1 | 3 | 4 | 2 | 5 | 4 | 4 | 1 | 3 | 1 | | 0.522 | | |
| cf8 | Length of concession period proposed. | 3 | 4 | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 3 | 3 | 2 | 4 | 3 | 3 | 2 | 3 | 1 | | 0.478 | | |
| cf9 | Level of third party revenue to be generated. | 2 | 4 | 1 | 3 | 1 | 2 | 1 | 1 | 1 | 3 | 2 | 2 | 4 | 3 | 3 | 1 | 2 | 1 | | 0.411 | | |
| cf10 | High Equity/debt ratio so as to drive commitment. | 2 | 2 | 2 | 2 | 3 | 2 | 1 | 3 | 1 | 4 | 3 | 2 | 4 | 1 | 3 | 4 | 2 | 2 | | 0.478 | | |
| | | | 38 | 27 | 35 | 26 | 34 | 17 | 19 | 30 | 41 | 31 | 33 | 43 | 38 | 35 | 30 | 32 | 25 | | | | |

Appendix C.3

## Model Validation - *Consortium Attributes*

| | | ratings-allprjts (A) *n* = 49 | | | | ratings - civilengprjts (B) *n* = 13 | | | | ratings for hospitalprjts ( C ) *n* = 14 | | | | ratings for schlsprjts (D) *n* = 18 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $I_{sub}$ | $r_{sub}$ | $I_{main}$ | $r_{main}$ | $I_{sub}$ | $r_{sub}$ | $I_{main}$ | $r_{main}$ | $I_{sub}$ | $r_{sub}$ | $I_{main}$ | $r_{main}$ | $I_{sub}$ | $r_{sub}$ | $I_{main}$ | $r_{main}$ |
| | **Nature and Strength** | | | 0.738 | 1 | | | 0.717 | 2 | | | 0.757 | 1 | | | 0.733 | 1 |
| cs1 | Previous experience in PPP procurement | 0.782 | 8 | | | 0.754 | 7.5 | | | 0.857 | 2 | | | 0.800 | 5 | | |
| cs2 | Reputation enjoyed by the consortium. | 0.702 | 11 | | | 0.631 | 16 | | | 0.800 | 8 | | | 0.656 | 16 | | |
| cs3 | PPP being a strategic business interest | 0.686 | 12 | | | 0.662 | 13 | | | 0.743 | 12.5 | | | 0.689 | 12.5 | | |
| cs4 | Ability to tie equity into the project for a long period. | 0.662 | 13 | | | 0.708 | 10.5 | | | 0.629 | 17 | | | 0.689 | 12.5 | | |
| cs5 | Readiness to accept risk. | 0.816 | 6 | | | 0.938 | 1 | | | 0.757 | 11 | | | 0.767 | 9.5 | | |
| cs6 | Open/frank communication during the negotiations. | 0.841 | 3 | | | 0.831 | 4.5 | | | 0.914 | 5.5 | | | 0.856 | 3 | | |
| cs7 | Willingness to commit to earlier negotiated terms. | 0.751 | 10 | | | 0.708 | 10.5 | | | 0.743 | 12.5 | | | 0.778 | 7 | | |
| cs8 | Current job holding of consortium members | 0.604 | 18 | | | 0.523 | 18 | | | 0.571 | 19 | | | 0.667 | 14.5 | | |
| cs9 | Appointing a dedicated bid manager | 0.866 | 1 | | | 0.908 | 2 | | | 0.800 | 9 | | | 0.867 | 2 | | |
| cs10 | Ability to understand what the public sector wants. | 0.853 | 2 | | | 0.831 | 4.5 | | | 0.914 | 1 | | | 0.811 | 4 | | |
| cs11 | Ability of consortium members to work harmoniously. | 0.820 | 5 | | | 0.846 | 3 | | | 0.843 | 3.5 | | | 0.767 | 9.5 | | |
| cs12 | Experience of previously working together as a team | 0.686 | 15 | | | 0.662 | 13 | | | 0.771 | 10 | | | 0.589 | 18 | | |
| cs13 | Taking proactive role in initiating the project | 0.629 | 17 | | | 0.538 | 17 | | | 0.671 | 16 | | | 0.667 | 14.5 | | |
| cs14 | Ability to obtain planning permission timeously. | 0.657 | 16 | | | 0.492 | 19 | | | 0.714 | 14.5 | | | 0.711 | 11 | | |
| cs15 | Early involvement of other stakeholders | 0.833 | 4 | | | 0.754 | 7.5 | | | 0.843 | 3.5 | | | 0.878 | 1 | | |
| cs16 | Personal attributes of the champion within the consortium. | 0.756 | 9 | | | 0.723 | 9 | | | 0.800 | 8 | | | 0.744 | 10 | | |
| cs17 | Ability to persevere during protracted negotiations | 0.812 | 7 | | | 0.815 | 6 | | | 0.914 | 5.5 | | | 0.789 | 8 | | |
| cs18 | The multidisciplinary nature of consortium team. | 0.669 | 14 | | | 0.646 | 15 | | | 0.714 | 14.5 | | | 0.644 | 17 | | |
| cs19 | Experience of previously working with the public sector procurer | 0.586 | 19 | | | 0.662 | 13 | | | 0.586 | 18 | | | 0.567 | | | |
| | **Quality of Technical Proposal** | | | 0.723 | 2 | | | 0.766 | 1 | | | 0.714 | 2 | | | 0.700 | 2 |
| ct1 | Robustness of outline technical proposal. | 0.780 | 2 | | | 0.831 | 2 | | | 0.771 | 1 | | | 0.767 | 2 | | |
| ct2 | Clarity of submissions and responses to queries | 0.800 | 1 | | | 0.846 | 1 | | | 0.757 | 2 | | | 0.811 | 1 | | |
| ct3 | Innovative technical solutions | 0.641 | 4 | | | 0.677 | 4 | | | 0.657 | 4 | | | 0.600 | 4 | | |
| ct4 | Provision of sound technical guarantee | 0.673 | 3 | | | 0.708 | 3 | | | 0.671 | 3 | | | 0.622 | 3 | | |
| | **Quality of the Financial Proposal** | | | 0.652 | 3 | | | 0.672 | 3 | | | 0.636 | 3 | | | 0.593 | 3 |
| cf1 | Level of financial guarantees provided/proposed by the consortium. | 0.738 | 4 | | | 0.769 | 3.5 | | | 0.686 | 5 | | | 0.744 | 3 | | |
| cf2 | Payment mechanisms proposed | 0.731 | 5 | | | 0.769 | 3.5 | | | 0.757 | 2 | | | 0.700 | 5 | | |
| cf3 | Level of government funding/guarantees required by the consortium. | 0.641 | 6 | | | 0.631 | 6.5 | | | 0.643 | 6 | | | 0.622 | 6 | | |
| cf4 | Levels of tariff/tolls proposed | 0.845 | 1 | | | 0.892 | 1 | | | 0.743 | 3 | | | 0.867 | 1 | | |
| cf5 | Credibility of financiers | 0.767 | 2 | | | 0.815 | 2 | | | 0.729 | 4 | | | 0.722 | 4 | | |
| cf6 | Level of exposure of the public sector organisation to financial risks | 0.763 | 3 | | | 0.738 | 5 | | | 0.800 | 1 | | | 0.756 | 2 | | |
| cf7 | Level of financial returns to the public sector organisation. | 0.561 | 8 | | | 0.523 | 8 | | | 0.557 | 8 | | | 0.522 | 7 | | |
| cf8 | Length of concession period proposed. | 0.567 | 7 | | | 0.631 | 6.5 | | | 0.586 | 7 | | | 0.478 | 8.5 | | |
| cf9 | Level of third party revenue to be generated. | 0.463 | 10 | | | 0.477 | 9.5 | | | 0.429 | 9.5 | | | 0.411 | 10 | | |
| cf10 | High Equity/debt ratio so as to drive commitment | 0.466 | 9 | | | 0.477 | 9.5 | | | 0.429 | 9.5 | | | 0.478 | 8.5 | | |

| | rho |
|---|---|
| rho between A and B for nature and strength | 0.882 |
| rho between A and C for nature and strength | 0.837 |
| rho between A and D for nature and strength | 0.856 |
| rho between B and C for nature and strength | 0.837 |
| rho between B and D for nature and strength | 0.748 |
| rho between C and D for nature and strength | 0.673 |
| $rhocs_{av}$ | 0.805 |
| rho between A and B for quality of tech proposal | 1.000 |
| rho between A and C for quality of technical proposal | 0.800 |
| rho between A and D for quality of technical proposal | 1.000 |
| rho between B and C for quality of technical proposal | 0.800 |
| rho between B and D for quality of technical proposal | 1.000 |
| rho between C and D for quality of technical proposal | 1.000 |
| $rhoct_{av}$ | 0.933 |
| rho between A and B for quality of financial proposal | 0.954 |
| rho between A and C for quality of financial proposal | 0.863 |
| rho between A and D for quality of finacial proposal | 0.942 |
| rho between B and C for quality of finacial proposal | 0.822 |
| rho between B and D for quality of finacial proposal | 0.865 |
| rho between C and D for quality of finacial proposal | 0.863 |
| $rhocf_{av}$ | 0.856 |
| $rho_{cen-o'all}$ | 0.875 |

*Notes.*
- *Isub.*- relative significance index for the sub-attributes
- *rsub.*- ranking of the sub-attributs
- *Imain.*- relative significance index of the main attributes
- *rmain.*- ranking of the main attributes
- *rho* - spearmam's rank correlation coefficient
- *allprjts - all projects*
- *civilengprjts.- civil engineering projects*
- *hospiprjts - hospital projects*

at 0.005 (5%) level of significance with N=33,
*rho* critical from statistical tables is 0.446

Since 0.875 is greater than 0.446 *Ho* is rejected

For N = 33, *rho* = 0.875 from the statistical tables shows that a value as large as this is significant at $p < 0.001$ level (one-tail test). Thus we could reject *Ho* at $\alpha = 0.001$ level.

### Further check using Kendall's Coefficient of Concordance

From the relationship $rhoav = \frac{kW-1}{k-1}$

where
*W* = Kendall Coefficient of Concordance (level of agreement)
*k* = is the sets of ranking (= 4)

*Hence* $W = \frac{rhoav(k-1)+1}{k}$

$W = 0.906$

again $\chi 2 = k(N-1)W$

with N = 33

$\chi 2 = 115.95$

From statistical tables we find that $\chi 1 \geq 115.95$ with a degree of freedom, *df* = N - 1 = 32 has a probability of occurrence under *Ho* of $p < 0.001$. Hence it can be concluded with considerable assurance that the likelihood of the samples coming from the same population is higher than it will be by chance.

The very low probability under the Ho associated with the observed value of W enables us to reject the null hypothesis that the ratings for the sets are unrelated. Hence we accept the alternative hypothesis that the ratings are related.

## General Rating of Public Sector Attributes

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | project ID | 50 | 49 | 40 | 38 | 33 | 31 | 29 | 19 | 15 | 13 | 12 | 3 | 2 | 1 | 48 | 47 | 46 | 45 | 42 | 41 | 39 | 35 | 34 | 32 | 28 | 27 | 23 | 14 | 9 | 8 | 6 | 5 | 21 | 17 | 11 | 7 | 44 | 37 | 30 | 22 | 20 | 18 | 43 | 36 | 26 | 24 | 16 | 10 | 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondent | pr | pr | pu | pu | pr | pu | pr | pr | pr | pr | pu | pu | pr | pr | pr | pr | pr | pr | pu | pu | pu | pr | pu | pu | pr | pu | pr | pr | pu | pr | pu | pr | pu | pu | pu | pu | pr | pu | pr | pr | pu | pr | pu | pr | pr | pu | pr | pr | pu | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | off | off | rdt | stl | rdt | rdt | rdt/b | rdt | rlt | fld | fld | w/s | rlt | w/s | rlt | isub | imain |
| | **Attributes** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | **Organisational Capabilities** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.736** |
| po1 | Ability to effectively sensitise public opinion on the project. | 5 | 5 | 2 | 3 | 3 | 4 | 4 | 4 | 3 | 3 | 4 | 4 | 3 | 5 | 2 | 4 | 4 | 3 | 2 | 3 | 3 | 3 | 1 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 5 | 5 | 5 | 3 | 3 | 2 | 3 | 1 | 4 | 3 | 4 | **0.686** | |
| po2 | Level of reputation enjoyed by the organisation. | 4 | 1 | 2 | 4 | 3 | 3 | 3 | 4 | 1 | 4 | 3 | 4 | 3 | 4 | 2 | 4 | 3 | 4 | 3 | 3 | 2 | 1 | 1 | 3 | 3 | 4 | 4 | 3 | 4 | 4 | 2 | 2 | 2 | 5 | 4 | 4 | 5 | 3 | 5 | 5 | 3 | 3 | 3 | 1 | 3 | 3 | 4 | 4 | 3 | **0.633** | |
| po3 | Level of bureaucracy in the decision making process. | 4 | 3 | 4 | 4 | 3 | 4 | 5 | 3 | 5 | 5 | 2 | 3 | 4 | 4 | 3 | 4 | 5 | 5 | 4 | 3 | 3 | 2 | 4 | 4 | 4 | 5 | 5 | 3 | 3 | 3 | 3 | 2 | 3 | 4 | 5 | 5 | 3 | 4 | 2 | 5 | 4 | 3 | 5 | 4 | 4 | 2 | 4 | 4 | 4 | **0.747** | |
| po4 | Attitude to cost e.g excessive desire to drive down cost | 3 | 3 | 4 | 3 | 3 | 4 | 4 | 2 | 3 | 4 | 2 | 3 | 3 | 4 | 4 | 4 | 5 | 3 | 3 | 4 | 4 | 1 | 1 | 4 | 3 | 5 | 5 | 4 | 4 | 3 | 2 | 3 | 4 | 2 | 5 | 5 | 4 | 3 | 5 | 5 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | 4 | 2 | **0.694** | |
| po5 | Top level commitment | 5 | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 4 | 1 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 4 | 4 | 3 | 5 | 5 | 4 | **0.902** | |
| po6 | Team collaboration and commitment | 5 | 4 | 4 | 3 | 4 | 5 | 5 | 4 | 3 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 3 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 4 | 5 | 3 | 5 | 3 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 3 | 5 | 5 | 4 | **0.865** | |
| po7 | Open/frank and flexible communication during negotiations. | 5 | 4 | 5 | 3 | 4 | 5 | 5 | 5 | 5 | 3 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 3 | 4 | 4 | 5 | 4 | 3 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 5 | 3 | 5 | 4 | 3 | 4 | 5 | 4 | 5 | 5 | 3 | 4 | 3 | 4 | 3 | 4 | **0.849** | |
| po8 | Pre-established PPP Unit | 4 | 3 | 4 | 4 | 3 | 5 | 5 | 4 | 4 | 5 | 2 | 2 | 3 | 3 | 3 | 4 | 3 | 4 | 2 | 1 | 3 | 2 | 1 | 3 | 4 | 4 | 5 | 3 | 3 | 3 | 3 | 2 | 3 | 1 | 2 | 3 | 4 | 3 | 1 | 5 | 3 | 3 | 3 | 2 | 4 | 4 | 2 | 5 | 4 | **0.637** | |
| po9 | Assisting in land acquisition and in obtaining permits | 4 | 2 | 4 | 2 | 4 | 3 | 5 | 4 | 4 | 3 | 3 | 4 | 3 | 4 | 2 | 4 | 4 | 3 | 5 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 5 | 4 | 3 | 1 | 2 | 5 | 4 | 3 | 5 | 1 | 5 | 5 | 4 | 4 | 3 | 4 | 4 | 4 | 2 | 4 | **0.698** | |
| po10 | Tapping knowledge and expertise gained elsewhere | 4 | 3 | 3 | 4 | 4 | 2 | 5 | 5 | 4 | 3 | 4 | 3 | 4 | 3 | 2 | 4 | 4 | 2 | 1 | 2 | 2 | 4 | 3 | 3 | 4 | 2 | 3 | 3 | 3 | 4 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 4 | 2 | 2 | 1 | 4 | 3 | **0.665** | |
| po11 | Commitment to earlier negotiated terms | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 5 | 4 | 4 | 3 | 5 | 4 | 4 | 3 | 3 | 3 | 4 | 1 | 4 | 3 | 4 | 3 | 5 | 4 | 5 | 4 | 3 | 4 | 3 | 3 | 5 | 5 | 4 | 4 | 5 | 5 | 4 | 4 | 3 | 1 | 3 | 3 | 4 | | **0.747** | |
| po12 | Ability to accept and absorb risks | 5 | 4 | 3 | 4 | 4 | 5 | 4 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | 2 | 3 | 5 | 3 | 2 | 3 | 5 | 3 | 4 | 3 | 4 | 4 | 4 | 3 | 1 | 2 | 4 | 2 | 5 | 4 | 3 | 5 | 5 | 3 | 5 | 4 | 2 | 3 | 4 | 3 | 2 | 4 | **0.714** | |
| | | 52 | 40 | 42 | 41 | 44 | 49 | 54 | 48 | 43 | 46 | 40 | 45 | 43 | 50 | 38 | 50 | 50 | 40 | 40 | 41 | 41 | 34 | 27 | 47 | 43 | 51 | 49 | 45 | 47 | 50 | 37 | 34 | 37 | 45 | 45 | 53 | 51 | 41 | 51 | 60 | 44 | 47 | 47 | 35 | 42 | 32 | 46 | 41 | 47 | | |
| | **Technical Capabilities** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.739** |
| pt1 | Strong in-house expertise | 5 | 5 | 2 | 4 | 5 | 1 | 5 | 3 | 5 | 3 | 4 | 3 | 4 | 4 | 3 | 4 | 2 | 3 | 4 | 5 | 4 | 3 | 5 | 4 | 4 | 4 | 5 | 3 | 3 | 5 | 3 | 1 | 1 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 3 | 5 | 3 | 2 | 4 | 4 | 4 | 5 | 4 | **0.759** | |
| pt2 | Sound preparatory work | 5 | 3 | 2 | 4 | 5 | 2 | 3 | 4 | 3 | 3 | 4 | 4 | 3 | 4 | 2 | 4 | 5 | 4 | 4 | 5 | 3 | 5 | 5 | 4 | 4 | 2 | 4 | 4 | 3 | 5 | 3 | 3 | 3 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 3 | 3 | 3 | 3 | 4 | 4 | **0.759** | |
| pt3 | Previous experience in PPP procurement | 4 | 4 | 2 | 4 | 4 | 1 | 5 | 4 | 4 | 3 | 5 | 2 | 5 | 4 | 3 | 4 | 4 | 3 | 4 | 5 | 3 | 2 | 1 | 3 | 4 | 3 | 4 | 3 | 3 | 2 | 4 | 1 | 3 | 2 | 3 | 4 | 5 | 3 | 4 | 5 | 3 | 5 | 3 | 2 | 3 | 3 | 3 | 4 | 4 | **0.678** | |
| pt4 | Experience in infrastructure procurement | 4 | 3 | 3 | 3 | 4 | 4 | 2 | 4 | 2 | 3 | 3 | 4 | 5 | 4 | 3 | 4 | 3 | 3 | 4 | 3 | 2 | 3 | 5 | 4 | 4 | 3 | 3 | 3 | 3 | 5 | 4 | 3 | 2 | 2 | 3 | 5 | 5 | 3 | 4 | 5 | 5 | 5 | 3 | 3 | 3 | 3 | 4 | 2 | 4 | **0.698** | |
| pt5 | Clear established evaluation criteria | 4 | 3 | 3 | 4 | 5 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 2 | 4 | 3 | 4 | 4 | 5 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 3 | 2 | 3 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 4 | 3 | 5 | 3 | 2 | 3 | 5 | 4 | 4 | **0.759** | |
| pt6 | Clear output specifications | 4 | 5 | 3 | 5 | 4 | 5 | 3 | 3 | 4 | 4 | 4 | 5 | 3 | 5 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 3 | 4 | 4 | 4 | 4 | 5 | 2 | 5 | 2 | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 5 | 4 | 4 | **0.829** | |
| pt7 | The use of standard bidding documents | 4 | 3 | 4 | 2 | 5 | 3 | 3 | 4 | 4 | 5 | 2 | 1 | 5 | 3 | 2 | 4 | 5 | 4 | 4 | 3 | 3 | 4 | 2 | 4 | 4 | 4 | 5 | 3 | 3 | 3 | 3 | 2 | 4 | 1 | 3 | 5 | 4 | 4 | 4 | 5 | 3 | 5 | 4 | 2 | 2 | 3 | 3 | 3 | 4 | **0.690** | |
| | | 30 | 26 | 19 | 26 | 32 | 19 | 24 | 25 | 25 | 25 | 26 | 24 | 27 | 28 | 20 | 28 | 27 | 26 | 28 | 27 | 22 | 24 | 26 | 27 | 29 | 24 | 31 | 26 | 22 | 29 | 24 | 16 | 20 | 23 | 25 | 32 | 31 | 28 | 30 | 35 | 26 | 32 | 28 | 19 | 21 | 24 | 27 | 26 | 28 | | |
| | **Financial Capabilities** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.578** |
| pf1 | Ability to raise funds through Bonds. | 3 | 2 | 3 | 3 | 2 | 5 | 1 | 2 | 1 | 3 | 1 | 2 | 4 | 4 | 2 | 3 | 3 | 1 | 1 | 3 | 3 | 1 | 1 | 3 | 3 | 2 | 4 | 3 | 1 | 1 | 2 | 1 | 1 | 1 | 4 | 4 | 1 | 5 | 2 | 1 | 1 | 3 | 3 | 1 | 1 | 1 | 4 | 1 | 4 | **0.457** | |
| pf2 | Strong financial support/guarantees from the central govt | 4 | 3 | 3 | 4 | 4 | 5 | 4 | 4 | 1 | 3 | 1 | 5 | 4 | 4 | 4 | 5 | 3 | 4 | 5 | 5 | 3 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 1 | 2 | 3 | 1 | 4 | 3 | 5 | 5 | 4 | 5 | 4 | 4 | 3 | 3 | 4 | 1 | 2 | 4 | 4 | **0.747** | |
| pf3 | Flexible tax regimes. | 3 | 3 | 3 | 3 | 4 | 1 | 1 | 2 | 1 | 3 | 2 | 1 | 4 | 4 | 2 | 3 | 4 | 4 | 1 | 2 | 3 | 1 | 1 | 3 | 4 | 2 | 4 | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 3 | 1 | 3 | 4 | 3 | 3 | 2 | 3 | 1 | 1 | 1 | 2 | 1 | 4 | **0.465** | |
| pf4 | Ability to provide equity finance | 4 | 1 | 4 | 2 | 4 | 1 | 1 | 2 | 1 | 4 | 1 | 5 | 1 | 3 | 2 | 3 | 5 | 1 | 1 | 3 | 2 | 1 | 1 | 3 | 3 | 2 | 4 | 3 | 1 | 1 | 1 | 1 | 1 | 5 | 3 | 3 | 1 | 3 | 5 | 1 | 1 | 4 | 1 | 1 | 1 | 1 | 5 | 1 | 2 | **0.453** | |
| pf5 | Capability to pay | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 1 | 3 | 4 | 5 | 4 | 5 | 4 | 3 | 3 | 4 | 5 | 5 | 2 | 1 | 5 | 3 | 4 | 5 | 4 | 3 | 5 | 5 | 5 | 1 | 3 | 5 | 4 | 4 | 5 | 2 | 1 | 5 | 1 | 5 | 5 | 5 | 5 | 1 | 5 | 5 | 2 | **0.767** | |
| | | 19 | 13 | 17 | 16 | 19 | 17 | 12 | 14 | 5 | 16 | 9 | 18 | 17 | 20 | 14 | 17 | 18 | 14 | 13 | 18 | 13 | 9 | 13 | 17 | 18 | 16 | 20 | 17 | 13 | 13 | 10 | 6 | 10 | 13 | 18 | 17 | 13 | 18 | 16 | 15 | 10 | 18 | 15 | 11 | 12 | 5 | 18 | 12 | 16 | | |

***Notes***

$$(\text{isub}) = \sum_{i=1}^{n} r/(r^* \times n)$$

$$(\text{imain}) = \sum_{i=1}^{n} r/(r^* \times n \times N)$$

where $(isub)$ = the relative significance index for the sub-attributes;
$(imain)$ = the relative significance index for the main attributes;
r = the degree of significance assigned by each respondent to the $i$ th attribute;
$r^*$ = the ideal or anchor score i.e. highest score (5 in this case);
n = the number of responses;
N = the total number of sub-attributes under each main attribute.

pr = private
pu = public
hlth = health
sch = school
off = offices
rdt = road transport
fld = flood defence
w/s = water and sewerage
rlt = rail transport

Appendix C.3

## General Rating of Public Sector Client Attributes

**Project Type: Civil Engineering** (Roads, Rail, Flood Defences, Waste Water and Sanitation Treatment,and Bridges)

| | | project ID | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | project ID | 44 | 37 | 30 | 22 | 20 | 18 | 43 | 36 | 26 | 24 | 16 | 10 | 4 | |
| | | respondent | pr | pu | pr | pr | pu | pu | pu | pr | pr | pu | pu | pr | pu | |
| | | project type | rdt | stl | rdt | rdt | rdt/l | rdt | rlt | fld | fld | w/s | rlt | w/s | rlt | |
| | **Attributes** | | | | | | | | | | | | | | | **lsub** / **lmain** |
| | **Organisational Capabilities** | | | | | | | | | | | | | | | **0.749** |
| po1 | Ability to effectively sensitise public opinion on the project. | | 4 | 3 | 5 | 5 | 5 | 3 | 3 | 2 | 3 | 1 | 4 | 3 | 4 | **0.692** |
| po2 | Level of reputation enjoyed by the organisation. | | 5 | 3 | 5 | 5 | 3 | 3 | 3 | 1 | 3 | 3 | 4 | 4 | 3 | **0.692** |
| po3 | Level of bureaucracy in the decision making process. | | 3 | 4 | 2 | 5 | 4 | 3 | 5 | 4 | 4 | 2 | 4 | 4 | 4 | **0.738** |
| po4 | Attitude to cost e.g. excessive desire to drive down cost | | 4 | 3 | 5 | 5 | 3 | 4 | 3 | 3 | 4 | 3 | 4 | 2 | 4 | **0.723** |
| po5 | Top level commitment | | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 4 | 4 | 3 | 5 | 5 | 4 | **0.877** |
| po6 | Team collaboration and commitment | | 5 | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 3 | 5 | 5 | 4 | **0.877** |
| po7 | Open/frank and flexible communication during negotiations. | | 4 | 3 | 4 | 5 | 4 | 5 | 5 | 3 | 4 | 3 | 4 | 3 | 4 | **0.785** |
| po8 | Pre-established PPP Unit | | 4 | 3 | 1 | 5 | 3 | 3 | 3 | 2 | 4 | 4 | 2 | 5 | 4 | **0.662** |
| po9 | Assisting in land acquisition and in obtaining permits | | 5 | 1 | 5 | 5 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 2 | 4 | **0.754** |
| po10 | Tapping knowledge and expertise gained elsewhere | | 5 | 4 | 5 | 5 | 4 | 4 | 4 | 2 | 2 | 1 | 4 | 3 | 4 | **0.723** |
| po11 | Commitment to earlier negotiated terms | | 4 | 4 | 5 | 5 | 3 | 5 | 4 | 4 | 3 | 1 | 3 | 3 | 4 | **0.738** |
| po12 | Ability to accept and absorb risks | | 4 | 3 | 5 | 5 | 3 | 5 | 4 | 2 | 3 | 4 | 3 | 2 | 4 | **0.723** |
| | | | 51 | 41 | 51 | 60 | 44 | 47 | 47 | 35 | 42 | 32 | 46 | 41 | 47 | |
| | **Technical Capabilities** | | | | | | | | | | | | | | | **0.752** |
| pt1 | Strong in-house expertise | | 5 | 5 | 5 | 5 | 3 | 5 | 3 | 2 | 4 | 4 | 4 | 5 | 4 | **0.831** |
| pt2 | Sound preparatory work | | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 3 | 3 | 3 | 3 | 4 | 4 | **0.800** |
| pt3 | Previous experience in PPP procurement | | 5 | 3 | 4 | 5 | 3 | 5 | 3 | 2 | 3 | 3 | 3 | 4 | 4 | **0.723** |
| pt4 | Experience in infrastructure procurement | | 5 | 3 | 4 | 5 | 5 | 5 | 3 | 3 | 3 | 3 | 4 | 2 | 4 | **0.754** |
| pt5 | Clear established evaluation criteria | | 5 | 4 | 4 | 5 | 4 | 3 | 5 | 3 | 2 | 3 | 5 | 4 | 4 | **0.785** |
| pt6 | Clear output specifications | | 2 | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 5 | 4 | 4 | **0.862** |
| pt7 | The use of standard bidding documents | | 4 | 4 | 4 | 5 | 3 | 5 | 4 | 2 | 2 | 3 | 3 | 3 | 4 | **0.708** |
| | | | 31 | 28 | 30 | 35 | 26 | 19 | 28 | 19 | 21 | 24 | 27 | 26 | 28 | |
| | **Financial Capabilities** | | | | | | | | | | | | | | | **0.551** |
| pf1 | Ability to raise funds through Bonds. | | 1 | 5 | 2 | 1 | 1 | 3 | 3 | 1 | 1 | 1 | 4 | 1 | 4 | **0.431** |
| pf2 | Strong financial support/guarantees from the central govt | | 5 | 5 | 4 | 5 | 4 | 4 | 3 | 3 | 4 | 1 | 2 | 4 | 4 | **0.738** |
| pf3 | Flexible tax regimes. | | 1 | 3 | 4 | 3 | 3 | 2 | 3 | 1 | 1 | 1 | 2 | 1 | 4 | **0.446** |
| pf4 | Ability to provide equity finance. | | 1 | 3 | 5 | 1 | 1 | 4 | 1 | 1 | 1 | 1 | 5 | 1 | 2 | **0.415** |
| pf5 | Capability to pay | | 5 | 2 | 1 | 5 | 1 | 5 | 5 | 5 | 5 | 1 | 5 | 5 | 2 | **0.723** |
| | | | 13 | 18 | 16 | 15 | 10 | 18 | 15 | 11 | 12 | 5 | 18 | 12 | 16 | |

## General Rating of Public Sector Attributes

**Project Type: Hospitals**

| Attributes | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | project ID | 50 | 49 | 40 | 38 | 33 | 31 | 29 | 19 | 15 | 13 | 12 | 3 | 2 | 1 | | | |
| | respondent | pr | pr | pu | pu | pr | pu | pr | pr | pr | pr | pu | pu | pr | pr | | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | | | |
| | | | | | | | | | | | | | | | | | lsub | lmain |
| | **Organisational Capabilities** | | | | | | | | | | | | | | | | | 0.758 |
| po1 | Ability to effectively sensitise public opinion on the project. | 5 | 5 | 2 | 3 | 3 | 4 | 4 | 4 | 3 | 3 | 4 | 4 | 3 | 5 | | 0.743 | |
| po2 | Level of reputation enjoyed by the organisation. | 4 | 1 | 2 | 4 | 3 | 3 | 3 | 4 | 1 | 4 | 3 | 4 | 3 | 4 | | 0.614 | |
| po3 | Level of bureaucracy in the decision making process. | 4 | 3 | 4 | 4 | 3 | 4 | 5 | 3 | 5 | 5 | 2 | 3 | 4 | 4 | | 0.757 | |
| po4 | Attitude to cost e.g. excessive desire to drive down cost | 3 | 3 | 4 | 3 | 3 | 4 | 4 | 2 | 3 | 4 | 2 | 3 | 3 | 4 | | 0.643 | |
| po5 | Top level commitment | 5 | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | | 0.943 | |
| po6 | Team collaboration and commitment | 5 | 4 | 4 | 3 | 4 | 5 | 5 | 4 | 3 | 4 | 5 | 4 | 4 | 5 | | 0.843 | |
| po7 | Open/frank and flexible communication during negotiations. | 5 | 4 | 5 | 3 | 4 | 5 | 5 | 5 | 5 | 3 | 4 | 4 | 4 | 5 | | 0.871 | |
| po8 | Pre-established PPP Unit | 4 | 3 | 4 | 4 | 3 | 5 | 5 | 4 | 4 | 5 | 2 | 2 | 3 | 3 | | 0.729 | |
| po9 | Assisting in land acquisition and in obtaining permits | 4 | 2 | 4 | 2 | 4 | 3 | 5 | 4 | 4 | 3 | 3 | 4 | 3 | 4 | | 0.700 | |
| po10 | Tapping knowledge and expertise gained elsewhere | 4 | 3 | 3 | 4 | 4 | 2 | 5 | 5 | 4 | 3 | 4 | 3 | 4 | 3 | | 0.729 | |
| po11 | Commitment to earlier negotiated terms | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 5 | 4 | 4 | | 0.757 | |
| po12 | Ability to accept and absorb risks | 5 | 4 | 3 | 4 | 4 | 5 | 4 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | | 0.771 | |
| | | 52 | 40 | 42 | 41 | 44 | 49 | 54 | 48 | 43 | 46 | 40 | 45 | 43 | 50 | | | |
| | **Technical Capabilities** | | | | | | | | | | | | | | | | | 0.727 |
| pt1 | Strong in-house expertise | 5 | 5 | 2 | 4 | 5 | 1 | 5 | 3 | 5 | 3 | 4 | 3 | 4 | 4 | | 0.757 | |
| pt2 | Sound preparatory work | 5 | 3 | 2 | 4 | 5 | 2 | 3 | 4 | 3 | 3 | 4 | 4 | 3 | 4 | | 0.700 | |
| pt3 | Previous experience in PPP procurement | 4 | 4 | 2 | 4 | 4 | 1 | 5 | 4 | 4 | 3 | 5 | 2 | 5 | 4 | | 0.729 | |
| pt4 | Experience in infrastructure procurement | 4 | 3 | 3 | 3 | 4 | 4 | 2 | 4 | 2 | 3 | 3 | 4 | 5 | 4 | | 0.686 | |
| pt5 | Clear established evaluation criteria | 4 | 3 | 3 | 4 | 5 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 2 | 4 | | 0.714 | |
| pt6 | Clear output specifications | 4 | 5 | 3 | 5 | 4 | 5 | 3 | 3 | 4 | 4 | 4 | 5 | 3 | 5 | | 0.814 | |
| pt7 | The use of standard bidding documents | 4 | 3 | 4 | 2 | 5 | 3 | 3 | 4 | 4 | 5 | 2 | 1 | 5 | 3 | | 0.686 | |
| | | 30 | 26 | 19 | 26 | 32 | 19 | 24 | 25 | 25 | 25 | 26 | 24 | 27 | 28 | | | |
| | **Financial Capabilities** | | | | | | | | | | | | | | | | | 0.606 |
| pf1 | Ability to raise funds through Bonds. | 3 | 2 | 3 | 3 | 2 | 5 | 1 | 2 | 1 | 3 | 1 | 2 | 4 | 4 | | 0.514 | |
| pf2 | Strong financial support/guarantees from the central govt | 4 | 3 | 3 | 4 | 4 | 5 | 4 | 4 | 1 | 3 | 1 | 5 | 4 | 4 | | 0.700 | |
| pf3 | Flexible tax regimes. | 3 | 3 | 3 | 3 | 4 | 1 | 1 | 2 | 1 | 3 | 2 | 1 | 4 | 4 | | 0.500 | |
| pf4 | Ability to provide equity finance. | 4 | 1 | 4 | 2 | 4 | 1 | 1 | 2 | 1 | 4 | 1 | 5 | 1 | 3 | | 0.486 | |
| pf5 | Capability to pay | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 1 | 3 | 4 | 5 | 4 | 5 | | 0.829 | |
| | | 19 | 13 | 17 | 16 | 19 | 17 | 12 | 14 | 5 | 16 | 9 | 18 | 17 | 20 | | | |

## General Rating of Public Sector Attributes

**Project Type: Schools**

**Attributes**

| | project ID | 48 | 47 | 46 | 45 | 42 | 41 | 39 | 35 | 34 | 32 | 28 | 27 | 23 | 14 | 9 | 8 | 6 | 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondent | pr | pr | pr | pr | pu | pu | pu | pr | pu | pu | pr | pu | pr | pr | pu | pu | pr | pu | | |
| | project type | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | | |
| | | | | | | | | | | | | | | | | | | | | isub | lmain |
| | **Organisational Capabilities** | | | | | | | | | | | | | | | | | | | | 0.707 |
| po1 | Ability to effectively sensitise public opinion on the project. | 2 | 4 | 4 | 3 | 2 | 3 | 3 | 3 | 1 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 3 | 3 | 0.644 | |
| po2 | Level of reputation enjoyed by the organisation. | 2 | 4 | 3 | 4 | 3 | 3 | 2 | 1 | 1 | 3 | 3 | 4 | 4 | 3 | 4 | 4 | 2 | 2 | 0.578 | |
| po3 | Level of bureaucracy in the decision making process. | 3 | 4 | 5 | 5 | 4 | 3 | 3 | 2 | 4 | 4 | 4 | 5 | 5 | 3 | 3 | 3 | 3 | 2 | 0.722 | |
| po4 | Attitude to cost e.g. excessive desire to drive down cost | 4 | 4 | 5 | 3 | 3 | 4 | 4 | 1 | 1 | 4 | 3 | 5 | 5 | 4 | 4 | 3 | 2 | 3 | 0.689 | |
| po5 | Top level commitment | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 4 | 1 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 0.878 | |
| po6 | Team collaboration and commitment | 4 | 4 | 5 | 3 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 5 | 0.889 | |
| po7 | Open/frank and flexible communication during negotiations. | 5 | 4 | 5 | 3 | 4 | 4 | 5 | 4 | 3 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 0.878 | |
| po8 | Pre-established PPP Unit | 3 | 4 | 3 | 4 | 2 | 1 | 3 | 2 | 1 | 3 | 4 | 4 | 5 | 3 | 3 | 3 | 3 | 2 | 0.589 | |
| po9 | Assisting in land acquisition and in obtaining permits | 2 | 4 | 4 | 3 | 5 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 5 | 4 | 3 | 1 | 0.656 | |
| po10 | Tapping knowledge and expertise gained elsewhere | 2 | 4 | 4 | 2 | 1 | 2 | 2 | 4 | 3 | 3 | 4 | 2 | 3 | 3 | 3 | 4 | 2 | 3 | 0.567 | |
| po11 | Commitment to earlier negotiated terms | 3 | 5 | 4 | 4 | 3 | 3 | 3 | 4 | 1 | 4 | 3 | 4 | 3 | 5 | 4 | 5 | 4 | 3 | 0.722 | |
| po12 | Ability to accept and absorb risks | 4 | 4 | 4 | 2 | 3 | 5 | 3 | 2 | 3 | 5 | 3 | 4 | 3 | 4 | 4 | 4 | 3 | 1 | 0.678 | |
| | | 38 | 50 | 50 | 40 | 40 | 41 | 41 | 34 | 27 | 47 | 43 | 51 | 49 | 45 | 47 | 50 | 37 | 34 | | |
| | **Technical Capabilities** | | | | | | | | | | | | | | | | | | | | 0.724 |
| pt1 | Strong in-house expertise | 3 | 4 | 2 | 3 | 4 | 5 | 4 | 3 | 5 | 4 | 4 | 4 | 5 | 3 | 3 | 5 | 3 | 1 | 0.722 | |
| pt2 | Sound preparatory work | 2 | 4 | 5 | 4 | 4 | 5 | 3 | 5 | 5 | 4 | 4 | 2 | 4 | 4 | 3 | 5 | 3 | 3 | 0.767 | |
| pt3 | Previous experience in PPP procurement | 3 | 4 | 4 | 3 | 4 | 5 | 3 | 2 | 1 | 3 | 4 | 3 | 4 | 3 | 3 | 2 | 4 | 1 | 0.622 | |
| pt4 | Experience in infrastructure procurement | 3 | 4 | 3 | 3 | 4 | 3 | 2 | 3 | 5 | 4 | 4 | 3 | 3 | 3 | 3 | 5 | 4 | 3 | 0.689 | |
| pt5 | Clear established evaluation criteria | 3 | 4 | 4 | 5 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 3 | 2 | 0.756 | |
| pt6 | Clear output specifications | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 3 | 4 | 4 | 4 | 0.822 | |
| pt7 | The use of standard bidding documents | 2 | 4 | 5 | 4 | 4 | 3 | 3 | 4 | 2 | 4 | 4 | 4 | 5 | 3 | 3 | 3 | 3 | 2 | 0.689 | |
| | | 20 | 28 | 27 | 26 | 28 | 27 | 22 | 24 | 26 | 27 | 29 | 24 | 31 | 26 | 22 | 29 | 24 | 16 | | |
| | **Financial Capabilities** | | | | | | | | | | | | | | | | | | | | 0.576 |
| pf1 | Ability to raise funds through Bonds. | 2 | 3 | 3 | 1 | 1 | 3 | 3 | 1 | 1 | 3 | 3 | 2 | 4 | 3 | 1 | 1 | 2 | 1 | 0.422 | |
| pf2 | Strong financial support/guarantees from the central govt | 4 | 5 | 3 | 4 | 5 | 5 | 3 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 1 | 2 | 0.833 | |
| pf3 | Flexible tax regimes. | 2 | 3 | 4 | 4 | 1 | 2 | 3 | 1 | 1 | 3 | 4 | 2 | 4 | 3 | 1 | 1 | 1 | 1 | 0.456 | |
| pf4 | Ability to provide equity finance. | 2 | 3 | 5 | 1 | 1 | 3 | 2 | 1 | 1 | 3 | 3 | 2 | 4 | 3 | 1 | 1 | 1 | 1 | 0.422 | |
| pf5 | Capability to pay | 4 | 3 | 3 | 4 | 5 | 5 | 2 | 1 | 5 | 3 | 4 | 5 | 4 | 3 | 5 | 5 | 5 | 1 | 0.744 | |
| | | 14 | 17 | 18 | 14 | 13 | 18 | 13 | 9 | 13 | 17 | 18 | 16 | 20 | 17 | 13 | 13 | 10 | 6 | | |

Appendix C.3

## Model Validation - *Public Sector Attributes*

| | | ratings - allpjts (A) *n* = 49 | | | | ratings - civilengprjts (B) *n* = 13 | | | | ratings for hospitalpjts ( C ) *n* = 14 | | | | ratings for schlspjts (D) *n* = 18 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *l sub* | *r sub* | *l main* | *r main* | *l sub* | *r sub* | *l main* | *r main* | *l sub* | *r sub* | *l main* | *r main* | *l sub* | *r sub* | *l main* | *r main* |
| | **Organisational Capabilities** | | | 0.736 | 2 | | | 0.7487 | 2 | | | 0.758 | 1 | | | 0.707 | 2 |
| po1 | Ability to effectively sensitise public opinion on the project | 0.686 | 9 | | | 0.692 | 10 5 | | | 0.743 | 7 | | | 0 644 | 9 | | |
| po2 | Level of reputation enjoyed by the organisation | 0 633 | 12 | | | 0 692 | 10 5 | | | 0 614 | 12 | | | 0 578 | 11 | | |
| po3 | Level of bureaucracy in the decision making process | 0 747 | 4 5 | | | 0.738 | 5 5 | | | 0.757 | 5 5 | | | 0.722 | 4 5 | | |
| po4 | Attitude to cost e g excessive desire to drive down cost | 0 694 | 8 | | | 0 723 | 8 | | | 0 643 | 11 | | | 0 689 | 6 | | |
| po5 | Top level commitment | 0 902 | 1 | | | 0 877 | 1 5 | | | 0 943 | 1 | | | 0 878 | 2 5 | | |
| po6 | Team collaboration and commitment | 0 865 | 2 | | | 0.877 | 1 5 | | | 0 843 | 3 | | | 0.889 | 1 | | |
| po7 | Open/frank and flexible communication during negotiations | 0 849 | 3 | | | 0.785 | 3 | | | 0 871 | 2 | | | 0.878 | 2 5 | | |
| po8 | Pre-established PPP Unit | 0.637 | 11 | | | 0.662 | 12 | | | 0.729 | 8 5 | | | 0 589 | 10 | | |
| po9 | Assisting in land acquisition and in obtaining permits | 0.698 | 7 | | | 0.754 | 4 | | | 0 700 | 10 | | | 0 656 | 8 | | |
| po10 | Tapping knowledge and expertise gained elsewhere | 0.665 | 10 | | | 0 723 | 8 | | | 0.729 | 8 5 | | | 0 567 | 12 | | |
| po11 | Commitment to earlier negotiated terms | 0.747 | 4 5 | | | 0.738 | 5 5 | | | 0 757 | 5 5 | | | 0 722 | 4 5 | | |
| po12 | Ability to accept and absorb risks | 0 714 | 6 | | | 0 723 | 8 | | | 0.771 | 4 | | | 0.678 | 7 | | |
| | **Technical Capabilities** | | | 0.739 | 1 | | | 0.7516 | 1 | | | 0 727 | 2 | | | 0.724 | 1 |
| pt1 | Strong in-house expertise | 0 759 | 3 | | | 0.831 | 2 | | | 0 757 | 2 | | | 0.722 | 4 | | |
| pt2 | Sound preparatory work | 0 758 | 3 | | | 0 800 | 3 | | | 0.700 | 5 | | | 0.767 | 2 | | |
| pt3 | Previous experience in PPP procurement | 0 678 | 7 | | | 0.723 | 6 | | | 0.729 | 3 | | | 0 622 | 7 | | |
| pt4 | Experience in infrastructure procurement | 0 698 | 5 | | | 0 754 | 5 | | | 0.696 | 6 5 | | | 0 689 | 5 5 | | |
| pt5 | Clear established evaluation criteria | 0.759 | 3 | | | 0.785 | 4 | | | 0.714 | 4 | | | 0.756 | 3 | | |
| pt6 | Clear output specifications | 0 829 | 1 | | | 0 862 | 1 | | | 0 814 | 1 | | | 0 822 | 1 | | |
| pt7 | The use of standard bidding documents | 0.690 | 6 | | | 0.708 | 7 | | | 0.686 | 6 5 | | | 0 689 | 5 5 | | |
| | **Financial Capabilities** | | | 0.578 | 3 | | | 0 5508 | 3 | | | 0 606 | 3 | | | 0.576 | 3 |
| pf1 | Ability to raise funds through Bonds | 0 457 | 4 | | | 0 431 | 4 | | | 0 514 | 3 | | | 0 422 | 4 5 | | |
| pf2 | Strong financial support/guarantees from the central govt | 0.747 | 2 | | | 0.738 | 1 | | | 0.700 | 2 | | | 0 833 | 1 | | |
| pf3 | Flexible tax regimes. | 0.465 | 3 | | | 0.446 | 3 | | | 0.500 | 4 | | | 0 456 | 3 | | |
| pf4 | Ability to provide equity finance. | 0 453 | 5 | | | 0 415 | 5 | | | 0 486 | 5 | | | 0.422 | 4 5 | | |
| pf5 | Capability to pay | 0.767 | 1 | | | 0.723 | 2 | | | 0 829 | 1 | | | 0.744 | 2 | | |

| | *rho* |
|---|---|
| rho between A and B for orgnal capacity | 0 911 |
| rho between A and C ditto | 0 866 |
| rho between A and D ditto | 0 946 |
| rho between B and C ditto | 0 676 |
| rho between B and D ditto | 0 833 |
| rho between C and D ditto | 0 768 |
| $rhopo_{av}$ | **0.833** |

| | |
|---|---|
| rho between A and B for technical capability | 0 927 |
| rho between A and C ditto | 0 642 |
| rho between A and D ditto | 0 964 |
| rho between B and C ditto | 0 721 |
| rho between B and D ditto | 0 829 |
| rho between C and D ditto | 0 418 |
| $rhopt_{av}$ | **0.732** |

| | |
|---|---|
| rho between A and B for financial capability | 0 900 |
| rho between A and C ditto | 0 900 |
| rho between A and D ditto | 0 872 |
| rho between B and C ditto | 0 600 |
| rho between B and D ditto | 0 975 |
| rho between C and D ditto | 0 718 |
| $rhopf_{av}$ | **0.861** |

$rho_{av'al}$ 0.808

Notes:
- *l sub.* - relative significance index for the sub-attributes
- *r sub.* - ranking of the sub-attribute
- *l main.* - relative significance index of the main attributes
- *r main:* - ranking of the main attributes
- *rho* - spearmam's rank correlation coefficient
- *allpjts* - *all projects*
- *civilengprjts:* - *civil engineering projects*
- *hospjprjts* - *hospital projects*

at 0.005 (5%) level of significance with N=24,
*rho*critical from statistical tables is *0.521*

since 0 808 is greater than 0 521 *Ho* is rejected

$p < 0.001$

For N = 24, *rhoav* = 0 838 from the statistical tables shows that a value as large as this is significant at $p < 0.001$ level (one-tail test). Thus we could reject *Ho* at $\alpha = 0.001$ level.

**Further check using Kendall's Coefficient of Concordance**

From the relationship $rhoav = \frac{kW-1}{k-1}$

where
*W* = Kendall Coefficient of Concordance (level of agreement)
*k* = is the sets of ranking (= 4)

Hence $W = \frac{rhoav(k-1)+1}{k}$

*W* = *0 856*

again $\chi 2 = k(N-1)W$

with N = 24

$\chi 2 =$ 78.784

From statistical tables we find that $\chi^2 \geq$ 78 784 with a degree of freedom, *df* = N - 1 = 23 has a probability of occurrence under *Ho* of $p < 0$ 001. Hence it can be concluded with considerable assurance that the likelihood of the samples coming from the same population is higher than it will be by chance.

The very low probability under the Ho associated with the observed value of W enables us to reject the null hypothesis that the ratings for the sets are unrelated. Hence we accept the alternative hypothesis that the ratings are related.

## General Rating of project Attributes

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | Attributes | | |

Appendix C.3

## General Rating of Project Attributes

**Project Type: Civil Engineering** (Roads, Rail, Flood Defences, Waste Water and Sanitation Treatment,and Bridges)

| | | project ID | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | project ID | 44 | 37 | 30 | 22 | 20 | 18 | 43 | 36 | 26 | 24 | 16 | 10 | 4 | |
| | | respondent | pr | pu | pr | pr | pu | pu | pu | pr | pr | pu | pu | pr | pu | |
| | | project type | rdt | stl | rdt | rdt | rdt/l | rdt | rlt | fld | fld | w/s | rlt | w/s | rlt | |
| | **Attributes** | | | | | | | | | | | | | | | **Isub** | **Imain** |
| | **Nature of Project** | | | | | | | | | | | | | | | | **0.657** |
| pn1 | Size and complexity | | 4 | 4 | 5 | 5 | 2 | 4 | 4 | 5 | 3 | 5 | 3 | 5 | 3 | **0.800** | |
| pn2 | Amenability to innovation. | | 3 | 3 | 5 | 5 | 3 | 4 | 4 | 4 | 4 | 1 | 3 | 3 | 3 | **0.692** | |
| pn3 | Project risk management | | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 3 | 4 | 3 | 3 | 3 | 3 | **0.785** | |
| pn4 | Impact of project on the environment. | | 3 | 2 | 5 | 5 | 4 | 4 | 4 | 2 | 5 | 1 | 3 | 1 | 3 | **0.646** | |
| pn5 | Need for a third party to improve existing infrastructure. | | 2 | 3 | 4 | 5 | 1 | 5 | 3 | 1 | 1 | 2 | 3 | 2 | 3 | **0.538** | |
| pn6 | Health and safety provoked by the project's development. | | 2 | 3 | 5 | 5 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | **0.600** | |
| pn7 | Level of design completion required at tender. | | 2 | 3 | 5 | 5 | 3 | 4 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | **0.631** | |
| pn8 | Ability of project to respond to future changes. | | 2 | 3 | 5 | 5 | 2 | 5 | 4 | 3 | 4 | 2 | 4 | 5 | 2 | **0.708** | |
| pn9 | Project location and site conditions. | | 2 | 3 | 5 | 5 | 3 | 4 | 4 | 1 | 5 | 1 | 3 | 2 | 3 | **0.631** | |
| pn10 | Uniqueness of project. | | 2 | 5 | 5 | 5 | 2 | 2 | 3 | 1 | 5 | 1 | 2 | 5 | 3 | **0.631** | |
| pn11 | Effect on existing public sector staff | | 2 | 5 | 5 | 3 | 3 | 3 | 4 | 2 | 2 | 2 | 2 | 1 | 3 | **0.569** | |
| | | | 27 | 38 | 54 | 53 | 31 | 43 | 41 | 27 | 38 | 24 | 31 | 32 | 31 | | |
| | **Marketability of Project** | | | | | | | | | | | | | | | | **0.674** |
| pm1 | Suitability for private participation. | | 5 | 5 | 5 | 5 | 3 | 4 | 5 | 4 | 3 | 4 | 3 | 5 | 3 | **0.831** | |
| pm2 | Level to which project must meet general public needs. | | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 4 | 1 | 3 | **0.815** | |
| pm3 | Possible land and property deals and buyouts. | | 4 | 4 | 5 | 3 | 5 | 3 | 3 | 3 | 1 | 1 | 2 | 4 | 3 | **0.631** | |
| pm4 | Useful life at the end of concession period. | | 4 | 5 | 1 | 5 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 4 | 3 | **0.738** | |
| pm5 | Bankability of project | | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 1 | 5 | 5 | 5 | 3 | **0.877** | |
| pm6 | Monopolistic advantage | | 2 | 4 | 5 | 5 | 2 | 3 | 3 | 3 | 3 | 4 | 2 | 2 | 3 | **0.631** | |
| pm7 | Ability of project to generate third party revenue. | | 2 | 2 | 5 | 3 | 1 | 3 | 2 | 1 | 1 | 1 | 3 | 2 | 3 | **0.446** | |
| pm8 | Opportunities for future refinancing | | 3 | 3 | 5 | 3 | 1 | 3 | 3 | 2 | 3 | 1 | 2 | 4 | 3 | **0.554** | |
| pm9 | Potential for property development rights | | 3 | 1 | 5 | 3 | 1 | 4 | 2 | 1 | 1 | 1 | 2 | 3 | 3 | **0.462** | |
| pm10 | Level of tariffs and tolls. | | 5 | 1 | 5 | 5 | 5 | 3 | 4 | 5 | 2 | 3 | 4 | 4 | 3 | **0.754** | |
| | | | 38 | 33 | 46 | 42 | 30 | 36 | 36 | 31 | 23 | 28 | 31 | 34 | 30 | | |

Appendix C.3

## General Rating of project Attributes

**Project Type: Hospitals**

| | project ID | 50 | 49 | 40 | 38 | 33 | 31 | 29 | 19 | 15 | 13 | 12 | 3 | 2 | 1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondent | pr | pr | pu | pu | pr | pu | pr | pr | pr | pr | pu | pu | pr | pr | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | | |
| | **Attributes** | | | | | | | | | | | | | | | **Isub** | **Imain** |
| | **Nature of Project** | | | | | | | | | | | | | | | | **0.674** |
| pn1 | Size and complexity | 4 | 2 | 4 | 4 | 3 | 5 | 5 | 3 | 5 | 5 | 4 | 4 | 4 | 4 | **0.800** | |
| pn2 | Amenability to innovation. | 3 | 2 | 3 | 3 | 5 | 2 | 3 | 4 | 1 | 3 | 4 | 3 | 1 | 3 | **0.571** | |
| pn3 | Project risk management | 5 | 3 | 4 | 3 | 4 | 4 | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 4 | **0.714** | |
| pn4 | Impact of project on the environment. | 4 | 4 | 3 | 2 | 4 | 1 | 3 | 4 | 4 | 3 | 2 | 3 | 2 | 4 | **0.614** | |
| pn5 | Need for a third party to improve existing infrastructure. | 4 | 3 | 3 | 4 | 3 | 1 | 3 | 5 | 2 | 3 | 2 | 2 | 2 | 3 | **0.571** | |
| pn6 | Health and safety provoked by the project's development. | 4 | 3 | 3 | 2 | 3 | 4 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 4 | **0.557** | |
| pn7 | Level of design completion required at tender. | 4 | 2 | 3 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 3 | 4 | **0.800** | |
| pn8 | Ability of project to respond to future changes. | 3 | 3 | 3 | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 3 | 5 | **0.829** | |
| pn9 | Project location and site conditions. | 3 | 2 | 3 | 2 | 3 | 5 | 3 | 3 | 4 | 4 | 3 | 4 | 4 | 3 | **0.657** | |
| pn10 | Uniqueness of project. | 3 | 2 | 4 | 2 | 4 | 4 | 3 | 4 | 3 | 4 | 2 | 2 | 4 | 3 | **0.629** | |
| pn11 | Effect on existing public sector staff | 4 | 4 | 3 | 4 | 4 | 5 | 1 | 5 | 3 | 3 | 2 | 2 | 3 | 4 | **0.671** | |
| | | 41 | 30 | 36 | 35 | 43 | 39 | 35 | 43 | 36 | 42 | 33 | 34 | 31 | 41 | | |
| | **Marketability of Project** | | | | | | | | | | | | | | | | **0.650** |
| pm1 | Suitability for private participation. | 4 | 4 | 5 | 4 | 5 | 3 | 3 | 5 | 3 | 4 | 4 | 5 | 5 | 5 | **0.843** | - |
| pm2 | Level to which project must meet general public needs. | 4 | 2 | 5 | 4 | 3 | 5 | 2 | 5 | 1 | 4 | 4 | 5 | 3 | 4 | **0.729** | |
| pm3 | Possible land and property deals and buyouts. | 3 | 4 | 4 | 3 | 4 | 2 | 5 | 4 | 2 | 3 | 2 | 1 | 2 | 3 | **0.600** | |
| pm4 | Useful life at the end of concession period. | 4 | 2 | 5 | 4 | 3 | 1 | 1 | 4 | 2 | 3 | 3 | 4 | 1 | 4 | **0.586** | |
| pm5 | Bankability of project | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | **0.957** | |
| pm6 | Monopolistic advantage | 4 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 4 | 3 | 2 | 1 | 2 | 4 | **0.529** | |
| pm7 | Ability of project to generate third party revenue. | 3 | 2 | 4 | 3 | 3 | 1 | 1 | 3 | 2 | 3 | 2 | 1 | 2 | 2 | **0.457** | |
| pm8 | Opportunities for future refinancing | 4 | 3 | 4 | 3 | 3 | 2 | 1 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | **0.543** | |
| pm9 | Potential for property development rights | 3 | 3 | 4 | 4 | 3 | 1 | 1 | 3 | 2 | 3 | 3 | 1 | 2 | 2 | **0.500** | |
| pm10 | Level of tariffs and tolls. | 4 | 3 | 4 | 4 | 3 | 5 | 3 | 2 | 4 | 3 | 4 | 5 | 5 | 4 | **0.757** | |
| | | 38 | 30 | 43 | 35 | 34 | 28 | 25 | 36 | 27 | 34 | 31 | 30 | 29 | 35 | | |

Appendix C.3

## General Rating of project Attributes

### Project Type: Schools

| | project ID | 48 | 47 | 46 | 45 | 42 | 41 | 39 | 35 | 34 | 32 | 28 | 27 | 23 | 14 | 9 | 8 | 6 | 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondent | pr | pr | pr | pr | pu | pu | pu | pr | pu | pu | pr | pu | pr | pr | pu | pu | pr | pu | | |
| | project type | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | | |
| | **Attributes** | | | | | | | | | | | | | | | | | | | isub | imain |
| | **Nature of Project** | | | | | | | | | | | | | | | | | | | | 0.664 |
| pn1 | Size and complexity | 2 | 3 | 5 | 4 | 4 | 5 | 4 | 5 | 5 | 3 | 2 | 5 | 4 | 3 | 3 | 4 | 4 | 3 | 0.756 | |
| pn2 | Amenability to innovation. | 3 | 3 | 4 | 3 | 2 | 3 | 3 | 2 | 1 | 3 | 3 | 2 | 5 | 3 | 3 | 4 | 4 | 3 | 0.600 | |
| pn3 | Project risk management | 4 | 4 | 4 | 2 | 4 | 4 | 3 | 4 | 3 | 5 | 3 | 3 | 5 | 5 | 3 | 4 | 4 | 4 | 0.756 | |
| pn4 | Impact of project on the environment. | 3 | 2 | 4 | 2 | 3 | 3 | 4 | 1 | 5 | 3 | 4 | 4 | 5 | 3 | 3 | 4 | 3 | 2 | 0.644 | |
| pn5 | Need for a third party to improve existing infrastructure. | 3 | 2 | 4 | 2 | 3 | 4 | 4 | 1 | 1 | 3 | 3 | 5 | 3 | 2 | 5 | 4 | 3 | 3 | 0.611 | |
| pn6 | Health and safety provoked by the project's development. | 2 | 3 | 4 | 2 | 3 | 3 | 2 | 1 | 5 | 3 | 3 | 3 | 4 | 3 | 4 | 4 | 3 | 3 | 0.611 | |
| pn7 | Level of design completion required at tender. | 4 | 3 | 5 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 2 | 4 | 3 | 3 | 4 | 0.711 | |
| pn8 | Ability of project to respond to future changes. | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 3 | 5 | 5 | 3 | 3 | 4 | 3 | 3 | 0.722 | |
| pn9 | Project location and site conditions. | 4 | 2 | 5 | 3 | 3 | 4 | 4 | 4 | 5 | 3 | 4 | 4 | 3 | 3 | 5 | 3 | 4 | 4 | 0.744 | |
| pn10 | Uniqueness of project. | 5 | 2 | 2 | 2 | 1 | 5 | 4 | 1 | 2 | 3 | 4 | 3 | 4 | 3 | 3 | 3 | 4 | 3 | 0.600 | |
| pn11 | Effect on existing public sector staff | 3 | 2 | 3 | 2 | 3 | 1 | 4 | 4 | 2 | 4 | 5 | 3 | 3 | 2 | 2 | 1 | 4 | 1 | 0.544 | |
| | | 36 | 29 | 44 | 29 | 33 | 40 | 39 | 31 | 36 | 37 | 38 | 40 | 45 | 32 | 38 | 38 | 39 | 33 | | |
| | **Marketability of Project** | | | | | | | | | | | | | | | | | | | | 0.636 |
| pm1 | Suitability for private participation. | 3 | 4 | 5 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 3 | 4 | 4 | 5 | 4 | 4 | 5 | 2 | 0.811 | |
| pm2 | Level to which project must meet general public needs. | 4 | 3 | 3 | 3 | 4 | 4 | 3 | 1 | 5 | 4 | 3 | 5 | 5 | 3 | 5 | 5 | 3 | 4 | 0.744 | |
| pm3 | Possible land and property deals and buyouts. | 2 | 2 | 4 | 3 | 3 | 4 | 3 | 4 | 2 | 4 | 3 | 2 | 3 | 3 | 4 | 4 | 3 | 3 | 0.622 | |
| pm4 | Useful life at the end of concession period. | 3 | 3 | 5 | 3 | 3 | 4 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 2 | 3 | 5 | 3 | 3 | 0.656 | |
| pm5 | Bankability of project | 1 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 4 | 1 | 4 | 5 | 4 | 0.844 | |
| pm6 | Monopolistic advantage | 2 | 3 | 4 | 3 | 3 | 3 | 3 | 1 | 1 | 3 | 4 | 1 | 3 | 3 | 3 | 2 | 3 | 1 | 0.511 | |
| pm7 | Ability of project to generate third party revenue. | 2 | 3 | 3 | 3 | 1 | 3 | 3 | 1 | 1 | 3 | 3 | 2 | 3 | 2 | 2 | 1 | 2 | 1 | 0.433 | |
| pm8 | Opportunities for future refinancing | 2 | 4 | 5 | 3 | 3 | 3 | 3 | 1 | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 4 | 3 | 2 | 0.611 | |
| pm9 | Potential for property development rights | 2 | 3 | 5 | 4 | 1 | 2 | 2 | 3 | 1 | 2 | 3 | 1 | 3 | 2 | 1 | 3 | 2 | 1 | 0.456 | |
| pm10 | Level of tariffs and tolls. | 2 | 3 | 4 | 4 | 5 | 5 | 2 | 1 | 5 | 3 | 2 | 5 | 3 | 2 | 4 | 4 | 5 | 1 | 0.667 | |
| | | 23 | 33 | 43 | 35 | 32 | 37 | 29 | 24 | 31 | 36 | 32 | 31 | 36 | 29 | 29 | 36 | 34 | 22 | | |

## Model Validation - *Project Attributes*

| | Attributes | rating-allpjts (A) *n* = 49 | | | | ratings - civilengprjts (B) *n* = 13 | | | | ratings for hospitalpjts ( C ) *n* = 14 | | | | ratings for schlspjts (D) *n* = 18 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $I_{sub}$ | $r_{sub}$ | $I_{main}$ | $r_{main}$ | $I_{sub}$ | $r_{sub}$ | $I_{main}$ | $r_{main}$ | $I_{sub}$ | $r_{sub}$ | $I_{main}$ | $r_{main}$ | $I_{sub}$ | $r_{sub}$ | $I_{main}$ | $r_{main}$ |
| | **Nature of Project** | | | 0.665 | 1 | | | 0.657 | 2 | | | 0.674 | 1 | | | 0.664 | 1 |
| pn1 | Size and complexity | 0.788 | 1 | | | 0.800 | 1 | | | 0.800 | 2.5 | | | 0.756 | 1.5 | | |
| pn2 | Amenability to innovation. | 0.624 | 7.5 | | | 0.692 | 4 | | | 0.571 | 9.5 | | | 0.600 | 9.5 | | |
| pn3 | Project risk management | 0.759 | 2.5 | | | 0.785 | 2 | | | 0.714 | 4 | | | 0.756 | 1.5 | | |
| pn4 | Impact of project on the environment | 0.633 | 6 | | | 0.646 | 5 | | | 0.614 | 8 | | | 0.644 | 6 | | |
| pn5 | Need for a third party to improve existing infrastructure. | 0.563 | 11 | | | 0.538 | 11 | | | 0.571 | 9.5 | | | 0.611 | 7.5 | | |
| pn6 | Health and safety provoked by the project's development. | 0.584 | 9.5 | | | 0.600 | 9 | | | 0.557 | 11 | | | 0.611 | 7.5 | | |
| pn7 | Level of design completion required at tender | 0.702 | 4 | | | 0.631 | 7 | | | 0.800 | 2.5 | | | 0.711 | 5 | | |
| pn8 | Ability of project to respond to future changes. | 0.759 | 2.5 | | | 0.708 | 3 | | | 0.829 | 1 | | | 0.722 | 4 | | |
| pn9 | Project location and site conditions. | 0.694 | 5 | | | 0.631 | 7 | | | 0.657 | 6 | | | 0.744 | 3 | | |
| pn10 | Uniqueness of project. | 0.624 | 7.5 | | | 0.631 | 7 | | | 0.629 | 7 | | | 0.600 | 9.5 | | |
| pn11 | Effect on existing public sector staff | 0.584 | 9.5 | | | 0.569 | 10 | | | 0.671 | 5 | | | 0.544 | 11 | | |
| | **Marketability of Project** | | | 0.656 | 2 | | | 0.674 | 1 | | | 0.650 | 2 | | | 0.636 | 2 |
| pm1 | Suitability for private participation. | 0.824 | 2 | | | 0.831 | 2 | | | 0.843 | 2 | | | 0.811 | 2 | | |
| pm2 | Level to which project must meet general public needs. | 0.755 | 3 | | | 0.815 | 3 | | | 0.729 | 4 | | | 0.744 | 3 | | |
| pm3 | Possible land and property deals and buyouts. | 0.637 | 6 | | | 0.631 | 6.5 | | | 0.600 | 5 | | | 0.622 | 6 | | |
| pm4 | Useful life at the end of concession period | 0.661 | 5 | | | 0.738 | 5 | | | 0.586 | 6 | | | 0.656 | 5 | | |
| pm5 | Bankability of project | 0.890 | 1 | | | 0.877 | 1 | | | 0.957 | 1 | | | 0.844 | 1 | | |
| pm6 | Monopolistic advantage | 0.539 | 8 | | | 0.631 | 6.5 | | | 0.529 | 8 | | | 0.511 | 8 | | |
| pm7 | Ability of project to generate third party revenue. | 0.453 | 10 | | | 0.446 | 10 | | | 0.457 | 10 | | | 0.433 | 10 | | |
| pm8 | Opportunities for future refinancing | 0.584 | 7 | | | 0.554 | 8 | | | 0.543 | 7 | | | 0.611 | 7 | | |
| pm9 | Potential for property development rights | 0.494 | 9 | | | 0.462 | 9 | | | 0.500 | 9 | | | 0.456 | 9 | | |
| pm10 | Level of tariffs and tolls. | 0.722 | 4 | | | 0.754 | 4 | | | 0.757 | 3 | | | 0.667 | 4 | | |

| | rho |
|---|---|
| rho between A and B for project nature | 0.873 |
| rho between A and C ditto | 0.802 |
| rho between A and D ditto | 0.839 |
| rho between B and C ditto | 0.530 |
| rho between B and D ditto | 0.656 |
| rho between C and D ditto | 0.568 |
| $rhopn_{av}$ | *0.711* |
| rho between A and B for marketability | 0.979 |
| rho between A and C ditto | 0.976 |
| rho between A and D ditto | 1.000 |
| rho between B and C ditto | 0.948 |
| rho between B and D ditto | 0.979 |
| rho between C and D ditto | 0.976 |
| $rhopm_{av}$ | *0.976* |
| $rho_{av\text{-}o'all}$ | 0.844 |

Notes:
- *Isub.* - relative significance index for the sub-attributes
- *rsub.* - ranking of the sub-attribute
- *Imain* - relative significance index of the main attributes
- *rmain.* - ranking of the main attributes
- *rho* - spearmam's rank correlation coefficient
- *allpjts.* - *all projects*
- *civilengprjts* - *civil engineering projects*
- *hosppjrts* - *hospital projects*

at 0.005 level of significance with N=21, rhocritical from statistical tables is 0.556

since 0.844 is greater than 0.556 *Ho* is rejected

p < 0.001

For N = 21, *rhoav* = 0.844 from the statistical tables shows that a value as large as this is significant at $p < 0.001$ level (one-tail test). Thus we could reject *Ho* at $\alpha = 0.001$ level.

### Further check using Kendall's Coefficient of Concordance

From the relationship $rhoav = \frac{kW-1}{k-1}$

where
*W* = Kendall Coefficient of Concordance (level of agreement)
*k* = is the sets of ranking (= 4)

*Hence* $W = \frac{rhoav(k-1)+1}{k}$

$W = 0.883$

again $\chi 2 = k(N-1)W$

with N = 21

$\chi 2 = 70.62$

From statistical tables we find that $\chi^2 \geq 70.62$ with a degree of freedom, *df* = N - 1 = 20 has a probability of occurrence under *Ho* of $p < 0.001$. Hence it can be concluded with considerable assurance that the likelihood of the samples coming from the same population is higher than it will be by chance.

The very low probability under the Ho associated with the observed value of W enables us to reject the null hypothesis that the ratings for the sets are unrelated. Hence we accept the alternative hypothesis that the ratings are related.

## General Rating of External Environment Attributes

Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)

| project ID | 80 | 49 | 40 | 38 | 33 | 31 | 29 | 19 | 16 | 13 | 12 | 3 | 2 | 1 | 48 | 47 | 46 | 45 | 42 | 41 | 39 | 35 | 34 | 32 | 28 | 27 | 23 | 14 | 9 | 8 | 6 | 5 | 21 | 17 | 11 | 7 | 44 | 37 | 30 | 22 | 20 | 18 | 43 | 36 | 26 | 24 | 15 | 10 | 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| respondent | pr | pr | pu | pu | pr | pu | pr | pr | pr | pr | pu | pu | pr | pr | pu | pr | pr | pr | pu | pu | pu | pr | pu | pu | pr | pu | pr | pr | pu | pu | pr | pu | pu | pu | pr | pr | pu | pr | pr | pr | pu | pu | pr | pr | pr | pu | pr | pu | pu |
| project type | hlth | sch | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | off | off | rdt | rdt | rdt | rdt | rdt | rdt | fld | fld | wts | rl | wts | rl | rl |

| Attributes | | |

## General Rating of External Environment Attributes - Civil Eng. Prjts

**Project Type: Roads, Rail, Flood Defences, Waste Water and Sanitation Treatment,and Bridges**

| | | project ID | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | project ID | 44 | 37 | 30 | 22 | 20 | 18 | 43 | 36 | 26 | 24 | 16 | 10 | 4 | |
| | | respondent | pr | pu | pr | pr | pu | pu | pu | pr | pr | pu | pu | pr | pu | |
| | | project type | rdt | stl | rdt | rdt | rdt/l | rdt | rlt | fld | fld | w/s | rlt | w/s | rlt | |
| | **Attributes** | | | | | | | | | | | | | | **Isub** | **Imain** |
| | **Socio-Economic** | | | | | | | | | | | | | | | **0.677** |
| es1 | Availability of traditional projects. | | 2 | 4 | 4 | 5 | 5 | 4 | 2 | 2 | 3 | 1 | 3 | 3 | 4 | 0.646 |
| es2 | Maturity of the financial markets. | | 4 | 4 | 5 | 5 | 4 | 5 | 3 | 3 | 2 | 1 | 3 | 3 | 4 | 0.708 |
| es3 | Perceived future economic uncertainties | | 3 | 4 | 5 | 5 | 3 | 4 | 3 | 4 | 2 | 1 | 3 | 3 | 3 | 0.662 |
| es4 | Potential for future equity purchase in PPP projects | | 4 | 3 | 5 | 5 | 2 | 5 | 2 | 2 | 3 | 1 | 3 | 3 | 5 | 0.662 |
| es5 | Strong public/private sector relationships. | | 4 | 1 | 5 | 5 | 3 | 4 | 5 | 3 | 4 | 2 | 3 | 3 | 4 | 0.708 |
| | | | 17 | 16 | 24 | 25 | 17 | 22 | 15 | 14 | 14 | 6 | 15 | 15 | 20 | |
| | **Political/Legal/Regulatory regime** | | | | | | | | | | | | | | | **0.619** |
| ep1 | Public acceptability of the PPP/Private Finance philosophy. | | 5 | 3 | 5 | 5 | 4 | 5 | 4 | 4 | 3 | 1 | 4 | 1 | 4 | 0.738 |
| ep2 | Stability of the political system. | | 5 | 5 | 5 | 5 | 2 | 4 | 3 | 4 | 3 | 3 | 4 | 1 | 3 | 0.723 |
| ep3 | Level of all-party political support for the philosophy. | | 5 | 5 | 5 | 5 | 2 | 4 | 4 | 3 | 3 | 1 | 5 | 1 | 3 | 0.708 |
| el1 | Clearly defined planning and regulatory frameworks. | | 4 | 4 | 2 | 5 | 4 | 4 | 3 | 5 | 3 | 3 | 4 | 3 | 3 | 0.7231 |
| el2 | Ability of foreign investors to repatriate earnings. | | 2 | 1 | 2 | 5 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 4 | 0.3846 |
| el3 | Clearly defined legislation on foreign ownership of property | | 2 | 2 | 2 | 5 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 4 | 0.4154 |
| el4 | Clearly defined legislation on intellectual property rights. | | 2 | 3 | 4 | 5 | 3 | 3 | 2 | 1 | 1 | 1 | 3 | 2 | 3 | 0.5077 |
| el5 | Clearly established institutional and policy frameworks on PPP/PFI | | 5 | 4 | 4 | 5 | 3 | 3 | 4 | 5 | 2 | 3 | 5 | 2 | 4 | 0.7538 |
| | | | 30 | 27 | 29 | 40 | 21 | 27 | 24 | 24 | 17 | 14 | 27 | 14 | 28 | |

## General Rating of extl environment Attributes

**Project Type: Hospitals**

| | project ID | 50 | 49 | 40 | 38 | 33 | 31 | 29 | 19 | 15 | 13 | 12 | 3 | 2 | 1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondent | pr | pr | pu | pu | pr | pu | pr | pr | pr | pr | pu | pu | pr | pr | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | | |
| ***Attributes*** | | | | | | | | | | | | | | | | **lsub** | **lmain** |
| | **Socio-Economic** | | | | | | | | | | | | | | | | **0.720** |
| es1 | Availability of traditional projects. | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 5 | **0.629** | |
| es2 | Maturity of the financial markets. | 4 | 3 | 4 | 4 | 3 | 4 | 5 | 4 | 5 | 4 | 3 | 5 | 4 | 4 | **0.800** | |
| es3 | Perceived future economic uncertainties | 4 | 3 | 4 | 4 | 3 | 4 | 3 | 3 | 3 | 5 | 2 | 4 | 4 | 3 | **0.700** | |
| es4 | Potential for future equity purchase in PPP projects | 3 | 3 | 4 | 3 | 4 | 1 | 3 | 3 | 5 | 4 | 2 | 3 | 4 | 3 | **0.643** | |
| es5 | Strong public/private sector relationships. | 5 | 4 | 4 | 5 | 4 | 3 | 5 | 3 | 5 | 3 | 4 | 5 | 4 | 4 | **0.829** | |
| | | 20 | 16 | 19 | 19 | 17 | 15 | 19 | 16 | 21 | 19 | 13 | 20 | 19 | 19 | | |
| | **Political/Legal/Regulatory regime** | | | | | | | | | | | | | | | | **0.650** |
| ep1 | Public acceptability of the PPP/Private Finance philosophy. | 5 | 2 | 5 | 4 | 5 | 3 | 4 | 4 | 4 | 4 | 2 | 3 | 4 | 4 | **0.757** | |
| ep2 | Stability of the political system. | 4 | 3 | 5 | 3 | 5 | 4 | 5 | 3 | 3 | 4 | 2 | 5 | 4 | 5 | **0.786** | |
| ep3 | Level of all-party political support for the philosophy. | 5 | 3 | 5 | 4 | 4 | 2 | 4 | 3 | 3 | 4 | 3 | 5 | 4 | 4 | **0.757** | |
| el1 | Clearly defined planning and regulatory frameworks. | 4 | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 5 | 4 | 3 | 3 | 4 | 4 | **0.714** | |
| el2 | Ability of foreign investors to repatriate earnings. | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 3 | 1 | 4 | 2 | 3 | 1 | 2 | **0.443** | |
| el3 | Clearly defined legislation on foreign ownership of property | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 4 | 1 | 3 | 1 | 2 | 2 | 2 | **0.443** | |
| el4 | Clearly defined legislation on intellectual property rights. | 3 | 4 | 3 | 2 | 4 | 1 | 2 | 3 | 5 | 3 | 2 | 2 | 3 | 3 | **0.571** | |
| el5 | Clearly established institutional and policy frameworks on PPP/PFI | 5 | 3 | 3 | 4 | 4 | 4 | 5 | 4 | 5 | 3 | 2 | 2 | 4 | 3 | **0.729** | |
| | | 33 | 24 | 30 | 24 | 31 | 19 | 25 | 27 | 27 | 29 | 17 | 25 | 26 | 27 | | |

## General Rating of exti environment Attributes

**Project Type: Schools**

| | project ID | 48 | 47 | 46 | 45 | 42 | 41 | 39 | 35 | 34 | 32 | 28 | 27 | 23 | 14 | 9 | 8 | 6 | 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondent | pr | pr | pr | pr | pu | pu | pu | pr | pu | pu | pr | pu | pr | pr | pu | pu | pr | pu | | |
| | project type | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | | |
| | ***Attributes*** | | | | | | | | | | | | | | | | | | | **lsub** | **lmain** |
| | **Socio-Economic** | | | | | | | | | | | | | | | | | | | | **0.638** |
| es1 | Availability of traditional projects. | 3 | 3 | 4 | 3 | 5 | 3 | 1 | 1 | 5 | 3 | 2 | 2 | 4 | 2 | 4 | 3 | 1 | 1 | 0.556 | |
| es2 | Maturity of the financial markets. | 3 | 5 | 5 | 4 | 4 | 3 | 2 | 4 | 5 | 4 | 4 | 2 | 5 | 3 | 4 | 3 | 2 | 2 | 0.711 | |
| es3 | Perceived future economic uncertainties | 2 | 4 | 4 | 4 | 3 | 4 | 3 | 3 | 5 | 5 | 4 | 3 | 4 | 2 | 3 | 3 | 3 | 2 | 0.678 | |
| es4 | Potential for future equity purchase in PPP projects | 2 | 3 | 5 | 3 | 1 | 3 | 2 | 3 | 4 | 2 | 3 | 2 | 4 | 3 | 3 | 2 | 3 | 4 | 0.578 | |
| es5 | Strong public/private sector relationships. | 3 | 4 | 4 | 4 | 5 | 3 | 4 | 3 | 1 | 3 | 4 | 4 | 4 | 2 | 3 | 2 | 3 | 4 | 0.667 | |
| | | 13 | 19 | 22 | 18 | 18 | 16 | 12 | 14 | 20 | 17 | 17 | 13 | 21 | 12 | 17 | 13 | 12 | 13 | | |
| | **Political/Legal/Regulatory regime** | | | | | | | | | | | | | | | | | | | | **0.590** |
| ep1 | Public acceptability of the PPP/Private Finance philosophy. | 4 | 4 | 5 | 3 | 4 | 2 | 3 | 3 | 1 | 4 | 4 | 4 | 5 | 3 | 4 | 3 | 3 | 3 | 0.689 | |
| ep2 | Stability of the political system. | 2 | 4 | 5 | 3 | 4 | 3 | 3 | 3 | 1 | 4 | 4 | 4 | 4 | 3 | 4 | 5 | 1 | 3 | 0.667 | |
| ep3 | Level of all-party political support for the philosophy. | 2 | 4 | 5 | 3 | 3 | 3 | 2 | 5 | 2 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 2 | 0.678 | |
| el1 | Clearly defined planning and regulatory frameworks. | 4 | 4 | 5 | 2 | 5 | 3 | 4 | 5 | 5 | 4 | 5 | 4 | 5 | 2 | 4 | 5 | 4 | 2 | 0.800 | |
| el2 | Ability of foreign investors to repatriate earnings. | 2 | 2 | 3 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 3 | 1 | 3 | 4 | 1 | 2 | 1 | 1 | 0.378 | |
| el3 | Clearly defined legislation on foreign ownership of property | 1 | 2 | 3 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 3 | 1 | 3 | 3 | 1 | 2 | 1 | 1 | 0.356 | |
| el4 | Clearly defined legislation on intellectual property rights. | 1 | 3 | 4 | 2 | 2 | 3 | 2 | 1 | 1 | 2 | 4 | 1 | 3 | 2 | 2 | 4 | 1 | 1 | 0.433 | |
| el5 | Clearly established institutional and policy frameworks on PPP/PFI | 2 | 3 | 3 | 2 | 5 | 5 | 3 | 4 | 4 | 3 | 4 | 1 | 4 | 5 | 4 | 5 | 4 | 4 | 0.722 | |
| | | 18 | 26 | 33 | 19 | 25 | 23 | 21 | 23 | 16 | 25 | 31 | 20 | 31 | 25 | 24 | 29 | 19 | 17 | | |

**Model Validation - *External Environment Attributes***

| | Attributes | rating-allpjts (A) *n = 49* | | ratings - civilengprjts (B) *n = 13* | | ratings for hospitalpjts ( C ) *n = 14* | | ratings for schlspjts (D) *n = 18* | |
|---|---|---|---|---|---|---|---|---|---|
| | | *I sub* | *r sub* | *I sub* | *r sub* | *I sub* | *r sub* | *I sub* | *r sub* |
| | **Socio-Economic** | | *I main* 0 673 *r main* 2 | | *I main* 0 677 *r main* 1 | | *I main* 0.720 *r main* 1 | | *I main* 0 638 *r main* 1 |
| es1 | Availability of traditional projects. | 0 600 | 5 | 0 646 | 5 | 0 629 | 5 | 0 556 | 5 |
| es2 | Maturity of the financial markets. | 0.735 | 1 | 0 708 | 1 5 | 0 800 | 2 | 0 711 | 1 |
| es3 | Perceived future economic uncertainties | 0 682 | 3 | 0 662 | 3 5 | 0 700 | 3 | 0 678 | 2 |
| es4 | Potential for future equity purchase in PPP projects | 0 629 | 4 | 0 662 | 3 5 | 0 643 | 4 | 0 578 | 4 |
| es5 | Strong public/private sector relationships. | 0.722 | 2 | 0.708 | 1 5 | 0.829 | 1 | 0.667 | 3 |
| | **Politico/Legal/Regulatory regime** | | *I main* 0 623 *r main* 1 | | *I main* 0 619 *r main* 2 | | *I main* 0.650 *r main* 2 | | *I main* 0 590 *r main* 2 |
| ep1 | Public acceptability of the PPP/Private Finance philosophy | 0 739 | 3 | 0 738 | 2 | 0 757 | 2 5 | 0 689 | 3 |
| ep2 | Stability of the political system. | 0 727 | 4 | 0 723 | 3 5 | 0 786 | 1 | 0 667 | 5 |
| ep3 | Level of all-party political support for the philosophy. | 0 718 | 5 | 0 708 | 5 | 0 757 | 2 5 | 0 678 | 4 |
| el1 | Clearly defined planning and regulatory frameworks. | 0 751 | 1 | 0 723 | 3 5 | 0 714 | 5 | 0 800 | 1 |
| el2 | Ability of foreign investors to repatriate earnings | 0 396 | 8 | 0 385 | 8 | 0 443 | 7 5 | 0 378 | 7 |
| el3 | Clearly defined legislation on foreign ownership of property | 0 400 | 7 | 0 415 | 7 | 0 443 | 7 5 | 0 356 | 8 |
| el4 | Clearly defined legislation on intellectual property rights | 0 506 | 6 | 0 508 | 6 | 0 571 | 6 | 0 433 | 6 |
| el5 | Clearly established institutional and policy frameworks on PPP/PFI | 0.747 | 2 | 0.754 | 1 | 0.729 | 4 | 0.722 | 2 |

| | rho |
|---|---|
| rho between A and B for socio-economic | 0 949 |
| rho between A and C ditto | 0 949 |
| rho between A and D ditto | 0 900 |
| rho between B and C ditto | 0 949 |
| rho between B and D ditto | 0 738 |
| rho between C and D ditto | 0 700 |
| *rhoes av* | 0.864 |
| rho between A and B for political | 0 898 |
| rho between A and C ditto | 0 666 |
| rho between A and D ditto | 0 962 |
| rho between B and C ditto | 0 703 |
| rho between B and D ditto | 0 836 |
| rho between C and D ditto | 0 630 |
| *rhoep av* | 0.748 |
| *rhoav'ail* | 0.806 |

*Notes:*
*I sub* - relative significance index for the sub-attributes
*r sub* - ranking of the sub-attributes
*I main* - relative significance index of the main attributes
*r main* - ranking of the main attributes
*rho* - spearmam's rank correlation coefficient
*allpjts* - *all projects*
*civilengprjts* - *civil engineering projects*
*hospprjts* - *hospital projects*

at 0 05 level of significance with N=13, *rho*critical from statistical tables is 0 484

since 0 806 is greater than 0 484 *Ho* is rejected

$p < 0.001$

For N = 13, *rhoav* = 0 806 from the statistical tables shows that a value as large as this is significant at $p < 0.001$ level (one-tail test) Thus we could reject *Ho* at $\alpha = 0.001$ level

**Further check using Kendall's Coefficient of Concordance**

From the relationship $rhoav = \frac{kW-1}{k-1}$

where
*W* = Kendall Coefficient of Concordance (level of agreement)
*k* = is the sets of ranking (= 3)

Hence $W = \frac{rhoav(k-1)+1}{k}$

$W = 0.856$

again $\chi 2 = k(N-1)W$

with N = 13

$\chi 2 = 41.017$

From statistical tables we find that $\chi^2$ [illegible] 41 017 with a degree of freedom, *df* = N - 1 = 12 has a probability of occurrence under *Ho* of $p < 0.001$ Hence it can be concluded with considerable assurance that the likelihood of the samples coming from the same population is higher than it will be by chance

The very low probability under the Ho associated with the observed value of W enables us to reject the null hypothesis that the ratings for the sets are unrelated Hence we accept the alternative hypothesis that the ratings are related

## Feedback on the Generic Model

(ratings by the experts)

| Criterion / expert | scores | | | | | | | | | | rating of individual criterion | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *a* | *b* | *c* | *d* | *e* | *f* | *g* | *h* | *i* | *j* | ***rated index*** | ***%*** | ***ranking*** |
| Completeness | 4 | 3 | 3 | 3 | 3 | 2 | 3 | 4 | 4 | 4 | **0.660** | ***66*** | *3* |
| Practical Relevance | 5 | 3 | 2 | 3 | 3 | 4 | 4 | 4 | 5 | 3 | **0.720** | ***72*** | *1* |
| Robustness | 4 | 3 | 4 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | **0.680** | ***68*** | *2* |

***Notes:***

***The criteria for evaluating the model are as follows:***

***Completeness:*** Comprehensiveness in the coverage of the key attributes.
***Practical Relevance:*** The usefulness of the model in identifying competency gaps.
***Robustness:*** The extent to which the model reflects reality as a guide to decision making.

$$\textit{rated index} = \sum_{i=1}^{n} r/(r^* \times n)$$

where r = the score assigned by the expert to each criterion;
r* = the ideal or anchor score i.e. highest score (5 in this case);
n = the number of experts.

# Appendix D: Statistical computations for testing the perceptual differences (Hypothesis 3)

## Appendix D: Statistical computations for testing Perceptual Differences (Hypothesis 3)

### Summary Statistics for Testing Perceptual Differences (Hypothesis 3)

| Main Components | Main Attributes | The Model Results (n=49) | | Sectors | | | | Spearman's Correlation Coefficient(*prvpub*) $\sigma$ | Kendall's Coefficient of Concordance(*prvpub*) *W* | Statistical test of significance (one-tail test) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Private Sector (n = 25) | | Public Sector (n = 24) | | | | |
| | | Relative Significance Index | Ranking | Relative Significance Index | Ranking | Relative Significance Index | Ranking | | | |
| The Consortium | *Nature and Strength* | 0.738 | 1 | 0.753 | 2 | 0.723 | 1 | 0.890 | 0.945 | $p < 0.001$ |
| | *Quality of Technical Proposal* | 0.723 | 2 | 0.776 | 1 | 0.669 | 2 | | | |
| | *Quality of the Financial Proposal* | 0.652 | 3 | 0.655 | 3 | 0.649 | 3 | | | |
| The Public Sector Client | *Organisational Capabilities* | 0.736 | 2 | 0.749 | 2 | 0.724 | 1.5 | 0.562 | 0.781 | $p < 0.0025$ |
| | *Technical Capabilities* | 0.739 | 1 | 0.753 | 1 | 0.724 | 1.5 | | | |
| | *Financial Capabilities* | 0.578 | 3 | 0.578 | 3 | 0.578 | 3 | | | |
| The Project | *Nature of Project* | 0.665 | 1 | 0.671 | 1 | 0.658 | 1 | -0.875 | 0.938 | $p < 0.001$ |
| | *Marketability of Project* | 0.656 | 2 | 0.653 | 2 | 0.659 | 2 | | | |
| The External Environment | *Socio-Economic* | 0.673 | 1 | 0.694 | 1 | 0.652 | 1 | 0.820 | 0.910 | $p < 0.001$ |
| | *Political/Legal/Regulatory Regime* | 0.623 | 2 | 0.650 | 2 | 0.595 | 2 | | | |

## General Rating of Consortium Attributes

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| Attributes | | project ID | 50 | 49 | 40 | 38 | 33 | 31 | 29 | 19 | 15 | 13 | 12 | 3 | 2 | 1 | 48 | 47 | 46 | 45 | 42 | 41 | 39 | 35 | 34 | 32 | 28 | 27 | 23 | 14 | 9 | 6 | 6 | 6 | 5 | 21 | 17 | 11 | 7 | 44 | 37 | 30 | 22 | 20 | 18 | 43 | 36 | 26 | 24 | 16 | 10 | 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | respondents | pr | pr | pu | pu | pr | pu | pr | pr | pr | pu | pu | pu | pr | pr | pr | pr | pr | pr | pu | pu | pu | pr | pu | pu | pr | pu | pr | pu | pu | pr | pu | pr | pu | pr | pu | pu | pr | pu | pr | pr | pu | pu | pu | pr | pr | pu | pu | pr | pu | | | |
| | | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | off | off | rdt | rdt | oil | rdt | rdt | rdt | rdt | rlt | fld | fld | w/s | rlt | w/s | rlt | | | |
| | | |

## Private sector rating of Consortium Attributes

Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)

| Attributes | | project ID | 50 | 49 | 33 | 29 | 19 | 15 | 13 | 2 | 1 | 48 | 47 | 46 | 45 | 35 | 28 | 23 | 14 | 6 | 21 | 44 | 39 | 22 | 36 | 26 | 10 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | respondents | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | | |
| | | project type | hth | hth | hth | hth | hth | hth | hth | hth | hth | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | rail | rail | rail | ltd | ltd | wfs | Isub | Imain |
| | **Nature and Strength** | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.753 |
| cs1 | Previous experience in PPP procurement. | | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 3 | 3 | 5 | 3 | 3 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 2 | 5 | 4 | 3 | 5 | 0.848 | |
| cs2 | Reputation enjoyed by the consortium. | | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 3 | 3 | 1 | 4 | 4 | 4 | 2 | 3 | 4 | 4 | 5 | 3 | 3 | 5 | 5 | 2 | 2 | 3 | 0.720 | |
| cs3 | PPP being a strategic business interest | | 4 | 2 | 5 | 5 | 4 | 1 | 4 | 3 | 4 | 2 | 4 | 4 | 4 | 2 | 3 | 4 | 4 | 5 | 3 | 4 | 5 | 5 | 3 | 3 | 1 | 0.704 | |
| cs4 | Ability to tie equity into the project for a long period | | 3 | 3 | 4 | 3 | 3 | 1 | 4 | 1 | 3 | 2 | 4 | 4 | 3 | 2 | 4 | 4 | 5 | 5 | 1 | 4 | 1 | 5 | 4 | 4 | 1 | 0.624 | |
| cs5 | Readiness to accept risk. | | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 3 | 4 | 3 | 5 | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 0.808 | |
| cs6 | Open/frank communication during the negotiations. | | 5 | 4 | 5 | 5 | 5 | 3 | 3 | 3 | 4 | 3 | 5 | 5 | 4 | 5 | 3 | 5 | 5 | 5 | 3 | 4 | 5 | 5 | 3 | 5 | 2 | 0.832 | |
| cs7 | Willingness to commit to earlier negotiated terms. | | 4 | 3 | 5 | 4 | 3 | 5 | 3 | 3 | 4 | 4 | 5 | 5 | 4 | 3 | 4 | 4 | 3 | 4 | 3 | 3 | 5 | 5 | 2 | 4 | 2 | 0.752 | |
| cs8 | Current job holding of consortium members. | | 4 | 3 | 4 | 4 | 3 | 1 | 4 | 3 | 3 | 2 | 4 | 4 | 4 | 3 | 3 | 3 | 4 | 3 | 5 | 4 | 3 | 3 | 1 | 2 | 1 | 0.624 | |
| cs9 | Appointing a dedicated bid manager | | 5 | 3 | 5 | 4 | 5 | 3 | 4 | 4 | 5 | 1 | 5 | 5 | 5 | 4 | 4 | 5 | 3 | 5 | 5 | 4 | 5 | 5 | 5 | 4 | 5 | 0.864 | |
| cs10 | Ability to understand what the public sector wants. | | 4 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 2 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 0.864 | |
| cs11 | Ability of consortium members to work harmoniously | | 4 | 4 | 5 | 5 | 4 | 3 | 4 | 4 | 5 | 3 | 4 | 4 | 5 | 4 | 3 | 4 | 4 | 5 | 4 | 4 | 5 | 5 | 4 | 4 | 3 | 0.824 | |
| cs12 | Experience of previously working together as a team | | 4 | 4 | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 1 | 4 | 4 | 4 | 2 | 3 | 5 | 4 | 3 | 4 | 4 | 5 | 5 | 3 | 3 | 3 | 0.776 | |
| cs13 | Taking proactive role in initiating the project. | | 4 | 4 | 3 | 5 | 5 | 1 | 4 | 4 | 3 | 3 | 4 | 4 | 4 | 2 | 4 | 4 | 3 | 4 | 3 | 3 | 5 | 2 | 1 | 2 | 1 | 0.656 | |
| cs14 | Ability to obtain planning permission timeously. | | 4 | 3 | 5 | 4 | 4 | 1 | 5 | 4 | 3 | 5 | 4 | 4 | 2 | 4 | 4 | 4 | 2 | 3 | 3 | 3 | 1 | 1 | 2 | 2 | 1 | 0.624 | |
| cs15 | Early involvement of other stakeholders | | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 5 | 2 | 3 | 3 | 0.856 | |
| cs16 | Personal attributes of the champion within the consortium. | | 5 | 3 | 3 | 5 | 5 | 3 | 4 | 4 | 5 | 2 | 4 | 4 | 5 | 5 | 3 | 4 | 3 | 4 | 3 | 3 | 5 | 5 | 4 | 3 | 3 | 0.776 | |
| cs17 | Ability to persevere during protracted negotiations. | | 5 | 4 | 4 | 5 | 4 | 3 | 3 | 4 | 5 | 2 | 5 | 4 | 5 | 2 | 4 | 4 | 5 | 4 | 4 | 5 | 4 | 5 | 5 | 4 | 3 | 0.816 | |
| cs18 | The multidisciplinary nature of consortium team. | | 4 | 3 | 5 | 5 | 3 | 3 | 4 | 4 | 3 | 2 | 3 | 5 | 2 | 3 | 3 | 4 | 4 | 3 | 4 | 5 | 4 | 5 | 2 | 3 | 2 | 0.704 | |
| cs19 | Experience of previously working with the public sector procurer | | 4 | 2 | 2 | 5 | 5 | 1 | 4 | 4 | 3 | 1 | 3 | 4 | 2 | 1 | 3 | 4 | 3 | 4 | 2 | 5 | 4 | 5 | 1 | 4 | 3 | 0.632 | |
| | | | 80 | 65 | 84 | 87 | 81 | 56 | 74 | 67 | 73 | 48 | 80 | 80 | 73 | 62 | 67 | 80 | 70 | 82 | 68 | 78 | 79 | 86 | 58 | 64 | 48 | | |
| | **Quality of Technical Proposal** | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.776 |
| ct1 | Robustness of outline technical proposal. | | 4 | 4 | 5 | 4 | 3 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 1 | 4 | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 4 | 0.824 | |
| ct2 | Clarity of submissions and responses to queries | | 4 | 3 | 5 | 4 | 4 | 4 | 3 | 4 | 5 | 4 | 4 | 4 | 5 | 2 | 4 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 0.832 | |
| ct3 | Innovative technical solutions. | | 3 | 3 | 5 | 3 | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 1 | 5 | 4 | 3 | 3 | 3 | 4 | 5 | 5 | 3 | 4 | 3 | 0.704 | |
| ct4 | Provision of sound technical guarantee. | | 4 | 3 | 4 | 4 | 3 | 4 | 3 | 3 | 5 | 3 | 4 | 3 | 3 | 1 | 4 | 4 | 5 | 3 | 4 | 4 | 5 | 5 | 4 | 4 | 4 | 0.744 | |
| | | | 15 | 13 | 19 | 15 | 14 | 16 | 13 | 14 | 18 | 15 | 16 | 14 | 15 | 5 | 17 | 17 | 17 | 14 | 15 | 18 | 20 | 20 | 16 | 16 | 16 | | |
| | **Quality of the Financial Proposal** | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.655 |
| cf1 | Level of financial guarantees provided/proposed by the consortium. | | 4 | 3 | 4 | 3 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 1 | 3 | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 4 | 0.752 | |
| cf2 | Payment mechanisms proposed | | 5 | 3 | 5 | 4 | 4 | 3 | 3 | 4 | 3 | 4 | 4 | 2 | 3 | 1 | 3 | 4 | 5 | 4 | 4 | 4 | 5 | 5 | 4 | 4 | 4 | 0.752 | |
| cf3 | Level of government funding/guarantees required by the consortium. | | 4 | 3 | 5 | 4 | 3 | 1 | 3 | 3 | 3 | 3 | 4 | 3 | 4 | 1 | 3 | 4 | 4 | 4 | 4 | 4 | 3 | 5 | 2 | 2 | 2 | 0.648 | |
| cf4 | Levels of tariff/tolls proposed | | 4 | 4 | 4 | 2 | 4 | 5 | 4 | 3 | 3 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 3 | 5 | 0.824 | |
| cf5 | Credibility of financiers | | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 4 | 5 | 3 | 3 | 3 | 3 | 5 | 4 | 3 | 5 | 5 | 5 | 5 | 3 | 3 | 4 | 0.752 | |
| cf6 | Level of exposure of the public sector organisation to financial risks | | 4 | 4 | 3 | 4 | 4 | 5 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 4 | 5 | 3 | 3 | 5 | 1 | 5 | 4 | 3 | 5 | 0.752 | |
| cf7 | Level of financial returns to the public sector organisation. | | 3 | 3 | 3 | 2 | 3 | 1 | 3 | 1 | 3 | 3 | 3 | 2 | 5 | 1 | 4 | 5 | 4 | 3 | 2 | 4 | 1 | 5 | 1 | 2 | 1 | 0.544 | |
| cf8 | Length of concession period proposed. | | 4 | 2 | 3 | 1 | 3 | 3 | 4 | 3 | 3 | 3 | 4 | 2 | 3 | 1 | 3 | 4 | 3 | 3 | 2 | 4 | 5 | 5 | 3 | 3 | 1 | 0.600 | |
| cf9 | Level of third party revenue to be generated. | | 3 | 2 | 3 | 1 | 2 | 1 | 4 | 1 | 2 | 2 | 4 | 1 | 3 | 1 | 2 | 4 | 3 | 2 | 2 | 2 | 5 | 5 | 2 | 1 | 2 | 0.480 | |
| cf10 | High Equity/debt ratio so as to drive commitment. | | 3 | 3 | 3 | 1 | 2 | 1 | 3 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 | 1 | 2 | 1 | 3 | 4 | 1 | 4 | 2 | 1 | 0.448 | |
| | | | 37 | 31 | 37 | 26 | 33 | 26 | 33 | 25 | 29 | 33 | 38 | 27 | 35 | 19 | 31 | 43 | 38 | 32 | 33 | 40 | 39 | 46 | 32 | 27 | 29 | | |

***Notes***

$$(I_{sub}) = \sum_{i=1}^{n} r_i/(r^* x n)$$

$$(I_{main}) = \sum_{i=1}^{n} r_i/(r^* x n x N)$$

where $(I_{sub})$ = the relative significance index for the sub-attributes;
$(I_{main})$ = the relative significance index for the main attributes;
$r$ = the degree of significance assigned by each respondent to the $i$ th attribute;
$r^*$ = the ideal or anchor score i.e. highest score (5 in this case);
$n$ = the number of responses;
$N$ = the total number of sub-attributes under each main attribute.

## Public sector rating of Consortium Attributes

Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)

| Attributes | project ID | 40 | 38 | 31 | 12 | 3 | 42 | 41 | 39 | 34 | 32 | 27 | 9 | 8 | 5 | 17 | 11 | 7 | 37 | 20 | 18 | 43 | 24 | 16 | 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondents | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | | |
| | project type | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | off | sti | rsh/b | rdl | rl | ww/s | rl | rl | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | isub | imain |
| | **Nature and Strength** | | | | | | | | | | | | | | | | | | | | | | | | | | 0.723 |
| cs1 | Previous experience in PPP procurement. | 5 | 3 | 5 | 4 | 2 | 5 | 5 | 2 | 3 | 4 | 4 | 4 | 4 | 4 | 1 | 2 | 5 | 2 | 4 | 5 | 3 | 3 | 4 | 5 | 0.733 | |
| cs2 | Reputation enjoyed by the consortium. | 5 | 3 | 4 | 4 | 4 | 2 | 3 | 3 | 1 | 3 | 4 | 4 | 5 | 3 | 5 | 3 | 5 | 4 | 2 | 3 | 3 | 2 | 3 | 4 | 0.683 | |
| cs3 | PPP being a strategic business interest | 5 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 1 | 3 | 3 | 4 | 4 | 3 | 1 | 2 | 5 | 2 | 1 | 4 | 4 | 2 | 5 | 4 | 0.667 | |
| cs4 | Ability to tie equity into the project for a long period. | 3 | 4 | 4 | 3 | 5 | 4 | 3 | 3 | 3 | 4 | 2 | 4 | 4 | 2 | 5 | 4 | 5 | 3 | 5 | 3 | 3 | 4 | 4 | 5 | 0.742 | |
| cs5 | Readiness to accept risk. | 3 | 4 | 5 | 4 | 4 | 5 | 4 | 3 | 1 | 5 | 4 | 4 | 4 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 4 | 5 | 0.825 | |
| cs6 | Open/frank communication during the negotiations. | 3 | 4 | 4 | 4 | 5 | 5 | 3 | 5 | 3 | 5 | 4 | 4 | 3 | 5 | 5 | 5 | 5 | 5 | 4 | 3 | 5 | 4 | 4 | 5 | 0.850 | |
| cs7 | Willingness to commit to earlier negotiated terms. | 3 | 3 | 4 | 3 | 5 | 4 | 3 | 3 | 5 | 5 | 5 | 3 | 2 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 5 | 1 | 3 | 5 | 0.750 | |
| cs8 | Current job loading of consortium members. | 2 | 2 | 2 | 3 | 2 | 5 | 3 | 4 | 4 | 2 | 3 | 4 | 3 | 2 | 1 | 4 | 4 | 4 | 3 | 3 | 2 | 1 | 3 | 4 | 0.583 | |
| cs9 | Appointing a dedicated bid manager | 3 | 3 | 3 | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 3 | 5 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 3 | 5 | 4 | 5 | 0.867 | |
| cs10 | Ability to understand what the public sector wants. | 5 | 5 | 4 | 5 | 5 | 5 | 4 | 5 | 1 | 5 | 4 | 4 | 3 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 0.842 | |
| cs11 | Ability of consortium members to work harmoniously. | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 3 | 2 | 5 | 3 | 4 | 4 | 4 | 5 | 4 | 5 | 4 | 5 | 3 | 5 | 3 | 5 | 5 | 0.817 | |
| cs12 | Experience of previously working together as a team | 3 | 2 | 4 | 3 | 2 | 3 | 1 | 1 | 1 | 5 | 3 | 4 | 3 | 2 | 3 | 3 | 3 | 4 | 2 | 1 | 3 | 2 | 4 | 4 | 0.650 | |
| cs13 | Taking proactive role in initiating the project. | 2 | 3 | 1 | 4 | 4 | 3 | 4 | 3 | 1 | 4 | 3 | 4 | 4 | 2 | 3 | 2 | 4 | 3 | 4 | 3 | 3 | 1 | 3 | 4 | 0.600 | |
| cs14 | Ability to obtain planning permission timeously | 3 | 3 | 3 | 4 | 4 | 5 | 2 | 3 | 1 | 3 | 5 | 4 | 5 | 4 | 4 | 4 | 4 | 1 | 4 | 2 | 4 | 5 | 2 | 4 | 0.692 | |
| cs15 | Early involvement of other stakeholders | 3 | 3 | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 4 | 5 | 3 | 4 | 4 | 3 | 4 | 5 | 4 | 3 | 5 | 4 | 3 | 4 | 4 | 0.800 | |
| cs16 | Personal attributes of the champion within the consortium. | 5 | 2 | 5 | 3 | 4 | 4 | 3 | 4 | 5 | 4 | 4 | 4 | 3 | 2 | 4 | 3 | 5 | 3 | 3 | 3 | 3 | 2 | 5 | 5 | 0.733 | |
| cs17 | Ability to persevere during protracted negotiations. | 3 | 4 | 4 | 4 | 5 | 4 | 5 | 3 | 1 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 4 | 3 | 5 | 4 | 4 | 4 | 3 | 0.808 | |
| cs18 | The multidisciplinary nature of consortium team. | 4 | 3 | 2 | 3 | 4 | 4 | 3 | 2 | 3 | 4 | 3 | 4 | 4 | 2 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 0.633 | |
| cs19 | Experience of previously working with the public sector procurer. | 1 | 4 | 1 | 2 | 3 | 4 | 1 | 3 | 1 | 3 | 3 | 4 | 5 | 2 | 3 | 2 | 4 | 3 | 4 | 1 | 2 | 3 | 4 | 4 | 0.558 | |
| | | 85 | 83 | 88 | 89 | 75 | 78 | 65 | 64 | 47 | 78 | 71 | 73 | 74 | 62 | 88 | 86 | 88 | 66 | 66 | 64 | 67 | 57 | 73 | 82 | | |
| | **Quality of Tendered Proposal** | | | | | | | | | | | | | | | | | | | | | | | | | | 0.660 |
| ct1 | Robustness of outline technical proposal. | 3 | 3 | 4 | 3 | 4 | 4 | 3 | 3 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 4 | 5 | 4 | 3 | 3 | 3 | 5 | 3 | 0.733 | |
| ct2 | Clarity of submissions and responses to queries | 3 | 4 | 3 | 3 | 4 | 4 | 5 | 2 | 5 | 4 | 5 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 5 | 5 | 2 | 4 | 3 | 0.767 | |
| ct3 | Innovative technical solutions. | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 4 | 3 | 3 | 5 | 3 | 3 | 3 | 4 | 4 | 3 | 2 | 4 | 1 | 3 | 3 | 0.575 | |
| ct4 | Provision of sound technical guarantees. | 1 | 2 | 2 | 4 | 5 | 2 | 4 | 1 | 2 | 4 | 3 | 4 | 4 | 2 | 5 | 3 | 4 | 3 | 3 | 4 | 3 | 1 | 3 | 3 | 0.600 | |
| | | 10 | 12 | 12 | 13 | 16 | 12 | 14 | 7 | 13 | 16 | 15 | 15 | 17 | 13 | 16 | 11 | 16 | 16 | 14 | 14 | 15 | 7 | 15 | 12 | | |
| | **Quality of the Financial Proposal** | | | | | | | | | | | | | | | | | | | | | | | | | | 0.649 |
| cf1 | Level of financial guarantees provided/proposed by the consortium. | 4 | 4 | 2 | 3 | 5 | 2 | 3 | 2 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 2 | 4 | 4 | 4 | 3 | 3 | 2 | 4 | 4 | 0.725 | |
| cf2 | Payment mechanisms proposed | 4 | 4 | 3 | 4 | 4 | 2 | 5 | 1 | 5 | 5 | 4 | 3 | 5 | 3 | 3 | 2 | 4 | 3 | 2 | 5 | 5 | 1 | 4 | 4 | 0.708 | |
| cf3 | Level of government funding/guarantees required by the consortium. | 4 | 3 | 4 | 3 | 2 | 2 | 5 | 1 | 3 | 4 | 3 | 3 | 3 | 2 | 3 | 3 | 5 | 2 | 3 | 5 | 4 | 1 | 4 | 4 | 0.633 | |
| cf4 | Levels of tariff/tolls proposed | 4 | 4 | 4 | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 3 | 4 | 5 | 4 | 5 | 2 | 4 | 5 | 5 | 5 | 5 | 4 | 0.867 | |
| cf5 | Credibility of financiers | 4 | 4 | 5 | 3 | 4 | 4 | 3 | 3 | 3 | 5 | 4 | 4 | 3 | 3 | 5 | 4 | 5 | 5 | 3 | 3 | 5 | 3 | 5 | 4 | 0.783 | |
| cf6 | Level of exposure of the public sector organisation to financial risks | 4 | 4 | 5 | 4 | 5 | 4 | 4 | 1 | 5 | 5 | 4 | 4 | 3 | 4 | 3 | 4 | 5 | 3 | 4 | 4 | 4 | 1 | 5 | 4 | 0.775 | |
| cf7 | Level of financial returns to the public sector organisation. | 4 | 4 | 1 | 4 | 4 | 1 | 3 | 1 | 1 | 3 | 2 | 4 | 1 | 1 | 5 | 3 | 5 | 3 | 2 | 3 | 4 | 1 | 3 | 4 | 0.558 | |
| cf8 | Length of concession period proposed. | 3 | 4 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 3 | 2 | 3 | 2 | 1 | 3 | 4 | 5 | 3 | 2 | 2 | 4 | 1 | 4 | 4 | 0.533 | |
| cf9 | Level of third party revenue to be generated. | 3 | 3 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 3 | 2 | 3 | 1 | 1 | 5 | 4 | 2 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 0.425 | |
| cf10 | High Equity/debt ratio so as to drive commitment. | 1 | 3 | 2 | 2 | 3 | 3 | 2 | 1 | 1 | 4 | 2 | 3 | 4 | 2 | 3 | 3 | 3 | 1 | 2 | 2 | 4 | 1 | 3 | 3 | 0.483 | |
| | | 35 | 37 | 30 | 31 | 35 | 26 | 34 | 17 | 30 | 41 | 33 | 35 | 30 | 25 | 40 | 33 | 43 | 28 | 27 | 34 | 41 | 17 | 39 | 38 | | |

*Notes*

$$(i_{sub}) = \sum_{i=1}^{n} r/(r^* \times n)$$

$$(i_{main}) = \sum_{i=1}^{n} r/(r^* \times n \times N)$$

where $(i_{sub})$ = the relative significance index for the sub-attributes;
$(i_{main})$ = the relative significance index for the main attributes;
r = the degree of significance assigned by each respondent to the *i* th attribute;
$r^*$ = the ideal or anchor score i.e. highest score (5 in this case);
n = the number of responses;
N = the total number of sub-attributes under each main attribute.

Appendix D

## Testing of hypothesis 3: agreement between the private and public sectors - *Consortium Attributes*

| | | overall rating (A) $n = 49$ | | | | private sector rating $n = 25$ | | | | public sector rating $n = 24$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $I_{sub}$ | $r_{sub}$ | $I_{main}$ | $r_{main}$ | $I_{sub}$ | $r_{sub}$ | $I_{main}$ | $r_{main}$ | $I_{sub}$ | $r_{sub}$ | $I_{main}$ | $r_{main}$ |
| | Nature and Strength | | | 0.730 | 1 | | | 0.733 | 1 | | | 0.723 | 1 |
| cs1 | Previous experience in PPP procurement | 0.708 | 8 | | | 0.648 | 4 | | | 0.733 | 10.5 | | |
| cs2 | Reputation enjoyed by the consortium | 0.708 | 11 | | | 0.720 | 12 | | | 0.683 | 13 | | |
| cs3 | PPP being a strategic business interest | 0.696 | 12 | | | 0.704 | 13.5 | | | 0.667 | 14 | | |
| cs4 | Ability to be study into the project for a long period | 0.692 | 13 | | | 0.624 | 16 | | | 0.742 | 9 | | |
| cs5 | Readiness to accept risk | 0.816 | 6 | | | 0.800 | 8 | | | 0.826 | 4 | | |
| cs6 | Open/frank communication during the negotiations | 0.841 | 3 | | | 0.832 | 5 | | | 0.854 | 2 | | |
| cs7 | Willingness to commit to earlier negotiated terms | 0.701 | 10 | | | 0.752 | 11 | | | 0.750 | 8 | | |
| cs8 | Current job holding of consortium members | 0.694 | 10 | | | 0.624 | 16 | | | 0.583 | 17 | | |
| cs9 | Appointing a dedicated bid manager | 0.836 | 1 | | | 0.864 | 1.5 | | | 0.857 | 1 | | |
| cs10 | Ability to understand what the public sector wants | 0.813 | 2 | | | 0.864 | 1.5 | | | 0.842 | 3 | | |
| cs11 | Ability of consortium members to work harmoniously | 0.804 | 5 | | | 0.824 | 6 | | | 0.817 | 5 | | |
| cs12 | Experience of previously working together as a team | 0.696 | 15 | | | 0.776 | 9.5 | | | 0.646 | 19 | | |
| cs13 | Taking proactive role in initiating the project | 0.680 | 17 | | | 0.648 | 15 | | | 0.696 | 16 | | |
| cs14 | Ability to obtain planning permission timeously | 0.667 | 18 | | | 0.624 | 16 | | | 0.692 | 12 | | |
| cs15 | Early involvement of other stakeholders | 0.683 | 4 | | | 0.856 | 3 | | | 0.696 | 6.5 | | |
| cs16 | Personal attributes of the champion within the consortium | 0.706 | 9 | | | 0.776 | 9.5 | | | 0.733 | 10.5 | | |
| cs17 | Ability to persevere during protracted negotiations | 0.813 | 7 | | | 0.816 | 7 | | | 0.808 | 6.5 | | |
| cs18 | The multidisciplinary nature of consortium team | 0.696 | 14 | | | 0.704 | 13.5 | | | 0.833 | 15 | | |
| cs19 | Experience of previously working with the public sector procurer | 0.648 | 19 | | | 0.632 | 18 | | | 0.646 | 18 | | |
| | Quality of Technical Proposal | | | 0.783 | 2 | | | 0.776 | 2 | | | 0.669 | 2 |
| ct1 | Robustness of outline technical proposal | 0.788 | 2 | | | 0.824 | 2 | | | 0.733 | 2 | | |
| ct2 | Clarity of submissions and responses to queries | 0.836 | 1 | | | 0.832 | 1 | | | 0.767 | 1 | | |
| ct3 | Innovative technical solutions | 0.681 | 4 | | | 0.704 | 4 | | | 0.675 | 4 | | |
| ct4 | Provision of sound technical guarantee | 0.673 | 3 | | | 0.744 | 3 | | | 0.600 | 3 | | |
| | Quality of the Financial Proposal | | | 0.652 | 3 | | | 0.656 | 3 | | | 0.649 | 3 |
| cf1 | Level of financial guarantees provide/proposed by the consortium | 0.780 | 4 | | | 0.752 | 3.5 | | | 0.725 | 4 | | |
| cf2 | Payment mechanisms proposed | 0.734 | 5 | | | 0.752 | 3.5 | | | 0.708 | 5 | | |
| cf3 | Level of government funding/guarantees required by the consortium | 0.681 | 6 | | | 0.648 | 6 | | | 0.633 | 6 | | |
| cf4 | Levels of tariffs/fees proposed | 0.806 | 1 | | | 0.824 | 1 | | | 0.667 | 1 | | |
| cf5 | Credibility of financiers | 0.787 | 2 | | | 0.752 | 3.5 | | | 0.783 | 2 | | |
| cf6 | Level of exposure of the public sector organisation to financial risks | 0.708 | 3 | | | 0.752 | 3.5 | | | 0.775 | 3 | | |
| cf7 | Level of financial returns to the public sector organisation | 0.681 | 8 | | | 0.648 | 6 | | | 0.658 | 7 | | |
| cf8 | Length of concession period proposed | 0.667 | 7 | | | 0.680 | 7 | | | 0.633 | 8 | | |
| cf9 | Level of third party revenue to be generated | 0.463 | 10 | | | 0.488 | 9 | | | 0.425 | 10 | | |
| cf10 | High Equity/debt ratio so as to drive commitment | 0.466 | 9 | | | 0.448 | 10 | | | 0.483 | 9 | | |

| | rho |
|---|---|
| *rho private/public* for nature and strength | 0.727 |
| *rho private/public* for quality of financial proposal | 1.000 |
| *rho private/public* for quality of technical proposal | 0.944 |
| *rho av private/public-consortia* | 0.890 |

Notes
*I sub*:- relative significance index for the sub-attributes
*r sub*:- ranking of the sub-attribute
*I main*:- relative significance index of the main attributes
*r main*:- ranking of the main attributes
rho: spearmam's rank correlation coefficient

At 0.005 level of significance with N=33,
*rho critical* from statistical tables is 0.526

Since 0.936 is greater than 0.526 Ho is rejected

For N = 33, *rho av* = 0.890 from the statistical tables shows that a value as large as this is significant at $p < 0.001$ level (one-tail test) Thus we could reject Ho at $\alpha = 0.001$ level

Further check using Kendall's Coefficient of Concordance

From the relationship $r_{hoav} = \frac{kW - 1}{k - 1}$

where
$W$ = Kendall Coefficient of Concordance /level of agreement/
$k$ = is the sets of ranking (= 2)

Hence $W = \frac{r_{hoav}(k - 1) + 1}{k}$

$W = 0.945$

again $\chi 2 = k(N - 1)W$

with N = 33

$\chi 2 = 60.48$

From statistical tables we find that $\chi^2_{(1-1)}$ $\chi^2$ 60.48

with a $df = N - 1 = 32$ has a probability of occurrence under Ho of $p < .001$ Hence it can be concluded with considerable assurance that the agreement between the public and private is higher than it will be by chance

The very low probability under the Ho associated with the observed value of W enables us to reject the null hypothesis that the ratings for the sets are unrelated Hence we accept the alternative hypothesis that the ratings are related

## General Rating of Public Sector Attributes

Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)

| | project ID | 50 | 49 | 40 | 38 | 33 | 31 | 29 | 19 | 15 | 13 | 12 | 3 | 2 | 1 | 48 | 47 | 46 | 45 | 42 | 41 | 30 | 35 | 34 | 32 | 28 | 27 | 23 | 14 | 9 | 8 | 6 | 5 | 21 | 17 | 11 | 7 | 44 | 37 | 30 | 22 | 20 | 18 | 43 | 36 | 26 | 24 | 16 | 10 | 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondents | pr | pr | pu | pu | pr | pu | pr | pr | pr | pr | pu | pu | pr | pr | pr | pr | pr | pr | pu | pu | pu | pr | pu | pu | pr | pu | pr | pr | pu | pu | pr | pu | pr | pu | pu | pu | pr | pu | pr | pr | pu | pr | pu | pr | pu | pr | pu | pr | pu | | |
| | project type | hth | hth | hth | hth | hth | hth | hth | hth | hth | hth | hth | hth | hth | hth | ech | ech | ech | ech | ech | ech | ech | ech | ech | ech | ech | ech | ech | ech | ech | ech | ech | ech | off | off | off | off | rdt | rdt | rdt | rdt | rdt | rdt | rt | ltd | ltd | wts | rt | wts | rt | lmain | lmain |
| | **Attributes** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | **Organisational Capabilities** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.735 |
| po1 | Ability to effectively satisfied public opinion on the project | 5 | 5 | 2 | 3 | 3 | 4 | 4 | 4 | 3 | 3 | 4 | 4 | 3 | 5 | 2 | 4 | 4 | 3 | 2 | 3 | 3 | 3 | 1 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 5 | 5 | 5 | 3 | 3 | 2 | 3 | 1 | 4 | 3 | 4 | 0.806 | |
| po2 | Level of reputation enjoyed by the organisation | 4 | 1 | 2 | 4 | 3 | 3 | 3 | 4 | 1 | 4 | 3 | 4 | 3 | 4 | 2 | 4 | 3 | 4 | 3 | 3 | 2 | 1 | 1 | 3 | 3 | 4 | 4 | 3 | 4 | 4 | 2 | 2 | 2 | 5 | 4 | 4 | 5 | 3 | 5 | 5 | 3 | 3 | 3 | 1 | 3 | 3 | 4 | 4 | 3 | 0.833 | |
| po3 | Level of bureaucracy in the decision making process | 4 | 3 | 4 | 4 | 3 | 4 | 5 | 3 | 5 | 5 | 2 | 3 | 4 | 4 | 3 | 4 | 5 | 5 | 4 | 3 | 3 | 2 | 4 | 4 | 4 | 5 | 5 | 3 | 3 | 3 | 3 | 2 | 3 | 4 | 5 | 5 | 3 | 4 | 2 | 5 | 4 | 3 | 5 | 4 | 4 | 2 | 4 | 4 | 4 | 0.747 | |
| po4 | Attitude to cost e.g. excessive desire to drive down cost | 3 | 3 | 4 | 3 | 3 | 4 | 4 | 2 | 3 | 4 | 2 | 3 | 3 | 4 | 4 | 4 | 5 | 3 | 3 | 4 | 4 | 1 | 1 | 4 | 3 | 5 | 5 | 4 | 4 | 3 | 2 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 3 | 4 | 3 | 5 | 5 | 4 | 0.864 | |
| po5 | Top level commitment | 5 | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 3 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 5 | 3 | 5 | 3 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 3 | 5 | 5 | 4 | 0.862 | |
| po6 | Team collaboration and commitment | 5 | 4 | 4 | 3 | 4 | 5 | 5 | 4 | 3 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 3 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 5 | 3 | 5 | 3 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 3 | 5 | 5 | 4 | 0.865 | |
| po7 | Openness and flexible communication during negotiations | 5 | 4 | 5 | 3 | 4 | 5 | 5 | 5 | 5 | 3 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 3 | 4 | 4 | 5 | 4 | 3 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 4 | 5 | 3 | 5 | 4 | 3 | 4 | 5 | 4 | 5 | 5 | 3 | 4 | 3 | 4 | 3 | 4 | 0.848 | |
| po8 | Pre-established PPP Unit | 4 | 3 | 4 | 4 | 3 | 5 | 5 | 4 | 4 | 5 | 2 | 2 | 3 | 3 | 3 | 4 | 3 | 4 | 2 | 1 | 3 | 2 | 1 | 3 | 4 | 4 | 5 | 3 | 3 | 3 | 3 | 2 | 3 | 1 | 2 | 3 | 4 | 3 | 1 | 5 | 3 | 3 | 3 | 2 | 4 | 4 | 2 | 5 | 4 | 0.837 | |
| po9 | Assisting in land acquisition and in obtaining permits | 4 | 2 | 4 | 2 | 4 | 3 | 5 | 4 | 4 | 3 | 3 | 4 | 3 | 4 | 2 | 4 | 4 | 3 | 5 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 5 | 4 | 3 | 1 | 2 | 5 | 4 | 3 | 5 | 1 | 5 | 5 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 2 | 0.898 | |
| po10 | Tapping knowledge and expertise gained elsewhere | 4 | 3 | 3 | 4 | 4 | 2 | 5 | 5 | 4 | 3 | 4 | 3 | 4 | 3 | 2 | 4 | 4 | 2 | 1 | 2 | 2 | 4 | 3 | 3 | 4 | 2 | 4 | 3 | 3 | 3 | 4 | 2 | 3 | 3 | 3 | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 3 | 2 | 2 | 1 | 4 | 0.865 | |
| po11 | Commitment to earlier negotiated terms | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 3 | | 5 | 4 | 4 | 3 | 5 | 4 | 4 | 3 | 3 | 3 | 4 | 1 | 4 | 3 | 4 | 3 | 5 | 4 | 5 | 4 | 3 | 3 | 4 | 3 | 5 | 5 | 4 | 4 | 5 | 5 | 3 | 5 | 4 | 4 | 3 | 1 | 3 | 3 | 4 | 0.731 | |
| po12 | Ability to accept and absorb risks | 5 | 4 | 3 | 4 | 4 | 5 | 4 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | 2 | 3 | 5 | 3 | 2 | 3 | 5 | 3 | 4 | 3 | 4 | 4 | 4 | 3 | 1 | 2 | 4 | 2 | 5 | 4 | 3 | 5 | 5 | 3 | 5 | 4 | 2 | 3 | 4 | 3 | 2 | 4 | 0.714 | |
| | | 52 | 40 | 42 | 41 | 44 | 48 | 54 | 48 | 43 | 46 | 36 | 45 | 43 | 50 | 38 | 50 | 50 | 40 | 40 | 41 | 41 | 34 | 27 | 47 | 43 | 51 | 49 | 45 | 47 | 50 | 37 | 34 | 37 | 45 | 45 | 53 | 51 | 41 | 51 | 60 | 44 | 47 | 47 | 35 | 42 | 22 | 46 | 41 | 47 | | |
| | **Technical Capabilities** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.730 |
| pt1 | Strong in-house expertise | 5 | 5 | 2 | 4 | 5 | 1 | 5 | 3 | 5 | 3 | 4 | 3 | 4 | 4 | 3 | 4 | 2 | 3 | 4 | 5 | 4 | 3 | 5 | 4 | 4 | 4 | 5 | 3 | 3 | 5 | 3 | 1 | 1 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 3 | 5 | 3 | 2 | 4 | 4 | 4 | 5 | 4 | 0.756 | |
| pt2 | Sound preparatory work | 5 | 3 | 2 | 4 | 5 | 2 | 3 | 4 | 3 | 3 | 4 | 4 | 3 | 4 | 2 | 4 | 5 | 4 | 4 | 5 | 3 | 5 | 5 | 4 | 4 | 2 | 4 | 4 | 3 | 5 | 3 | 3 | 3 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 3 | 3 | 3 | 3 | 4 | 4 | 0.750 | |
| pt3 | Previous experience in PPP procurement | 4 | 4 | 2 | 4 | 4 | 1 | 5 | 4 | 4 | 3 | 5 | 2 | 5 | 4 | 3 | 4 | 4 | 3 | 4 | 5 | 3 | 2 | 1 | 3 | 4 | 3 | 4 | 3 | 3 | 2 | 4 | 1 | 3 | 2 | 3 | 4 | 5 | 3 | 4 | 5 | 3 | 5 | 3 | 2 | 3 | 3 | 3 | 4 | 4 | 0.678 | |
| pt4 | Experience in infrastructure procurement | 4 | 3 | 3 | 3 | 4 | 4 | 2 | 4 | 2 | 3 | 3 | 4 | 5 | 4 | 3 | 4 | 3 | 3 | 4 | 3 | 2 | 3 | 5 | 4 | 4 | 3 | 3 | 4 | 4 | 5 | 5 | 4 | 5 | 3 | 2 | 2 | 3 | 5 | 5 | 5 | 4 | 4 | 5 | 5 | 5 | 3 | 3 | 4 | 2 | 0.690 | |
| pt5 | Clear established evaluation criteria | 4 | 3 | 3 | 4 | 5 | 3 | 3 | 3 | 3 | 4 | 4 | 5 | 2 | 4 | 3 | 4 | 4 | 5 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 4 | 5 | 4 | 5 | 3 | 2 | 3 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 4 | 3 | 5 | 3 | 2 | 3 | 5 | 4 | 0.750 | |
| pt6 | Clear output specifications | 4 | 5 | 3 | 5 | 4 | 5 | 3 | 3 | 4 | 4 | 4 | 5 | 3 | 5 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 3 | 4 | 4 | 4 | 4 | 5 | 2 | 5 | 2 | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 5 | 4 | 4 | 0.829 | |
| pt7 | The use of standard bidding documents | 4 | 3 | 4 | 2 | 5 | 3 | 3 | 4 | 4 | 5 | 2 | 1 | 5 | 3 | 2 | 4 | 5 | 4 | 4 | 3 | 3 | 4 | 2 | 4 | 4 | 4 | 5 | 3 | 3 | 3 | 3 | 2 | 4 | 1 | 3 | 5 | 4 | 4 | 4 | 5 | 3 | 5 | 4 | 2 | 2 | 3 | 3 | 3 | 4 | 0.690 | |
| | | 30 | 26 | 19 | 26 | 32 | 19 | 24 | 25 | 25 | 25 | 26 | 24 | 27 | 28 | 20 | 28 | 27 | 26 | 28 | 27 | 22 | 24 | 26 | 27 | 29 | 24 | 31 | 26 | 22 | 29 | 24 | 16 | 20 | 23 | 25 | 32 | 31 | 28 | 30 | 35 | 26 | 32 | 28 | 19 | 21 | 24 | 27 | 26 | 28 | | |
| | **Financial Capabilities** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0.576 |
| pf1 | Ability to raise funds through Bonds | 3 | 2 | 3 | 3 | 2 | 5 | 1 | 2 | 1 | 3 | 1 | 2 | 4 | 4 | 2 | 3 | 3 | 1 | 1 | 3 | 3 | 1 | 1 | 3 | 3 | 2 | 4 | 3 | 1 | 1 | 2 | 1 | 1 | 1 | 4 | 4 | 1 | 5 | 2 | 1 | 1 | 3 | 3 | 1 | 1 | 1 | 4 | 1 | 4 | 0.457 | |
| pf2 | Strong financial support/guarantees from the central govt | 4 | 3 | 3 | 4 | 4 | 5 | 4 | 4 | 1 | 3 | 1 | 5 | 4 | 4 | 4 | 5 | 3 | 4 | 5 | 5 | 3 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 1 | 2 | 3 | 1 | 4 | 3 | 5 | 5 | 4 | 5 | 4 | 4 | 3 | 3 | 4 | 1 | 2 | 4 | 4 | 0.747 | |
| pf3 | Flexible tax regimes | 3 | 3 | 3 | 3 | 4 | 1 | 1 | 2 | 1 | 3 | 2 | 1 | 4 | 4 | 2 | 3 | 4 | 4 | 1 | 2 | 3 | 1 | 1 | 3 | 4 | 2 | 4 | 3 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 3 | 1 | 3 | 4 | 3 | 3 | 2 | 3 | 1 | 1 | 1 | 2 | 1 | 4 | 0.465 | |
| pf4 | Ability to provide equity finance | 4 | 1 | 4 | 2 | 4 | 1 | 1 | 2 | 1 | 4 | 1 | 5 | 1 | 3 | 2 | 3 | 5 | 1 | 1 | 3 | 2 | 1 | 1 | 3 | 3 | 2 | 4 | 3 | 1 | 1 | 1 | 1 | 1 | 5 | 3 | 3 | 1 | 2 | 5 | 1 | 1 | 4 | 1 | 1 | 1 | 1 | 5 | 1 | 2 | 0.453 | |
| pf5 | Capability to pay | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 1 | 3 | 4 | 5 | 4 | 5 | 4 | 3 | 3 | 4 | 5 | 5 | 2 | 1 | 5 | 3 | 4 | 5 | 4 | 3 | 5 | 5 | 5 | 1 | 3 | 5 | 4 | 4 | 5 | 2 | 1 | 5 | 1 | 5 | 5 | 5 | 5 | 1 | 5 | 5 | 2 | 0.767 | |
| | | 19 | 13 | 17 | 16 | 19 | 17 | 12 | 14 | 5 | 16 | 9 | 18 | 17 | 20 | 14 | 17 | 18 | 14 | 13 | 18 | 13 | 9 | 13 | 17 | 18 | 16 | 20 | 17 | 13 | 13 | 10 | 8 | 10 | 13 | 18 | 17 | 13 | 18 | 16 | 15 | 10 | 18 | 15 | 11 | 12 | 5 | 18 | 12 | 16 | | |

*Notes*

$$(i_{sub}) = \sum_{i=1}^{n} r_i/(r^* x n)$$

$$(i_{main}) = \sum_{i=1}^{n} r_i/(r^* x n x N)$$

where $(i_{sub})$ = the relative significance index for the sub-attributes;
$(i_{main})$ = the relative significance index for the main attributes;
r = the degree of significance assigned by each respondent to the *i* th attribute;
r* = the ideal or anchor score i.e. highest score (5 in this case);
n = the number of responses;
N = the total number of sub-attributes under each main attribute.

## Private Sector rating of Public Sector Attributes

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | Attributes | project ID | 50 | 49 | 33 | 29 | 19 | 15 | 13 | 2 | 1 | 48 | 47 | 46 | 45 | 35 | 28 | 23 | 14 | 6 | 21 | 44 | 30 | 22 | 36 | 26 | 10 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | respondents | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | | |
| | | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | rdt | rdt | rdt | fld | fld | w/s | isub | Imain |
| | **Organisational Capabilities** | | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.745** |
| po1 | Ability to effectively sensitise public opinon on the project. | | 5 | 5 | 3 | 4 | 4 | 3 | 3 | 3 | 5 | 2 | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 4 | 5 | 5 | 2 | 3 | 3 | 0.720 | |
| po2 | Level of reputation enjoyed by the organisation. | | 4 | 1 | 3 | 3 | 4 | 1 | 4 | 3 | 4 | 2 | 4 | 3 | 4 | 1 | 3 | 4 | 3 | 2 | 2 | 5 | 5 | 5 | 1 | 3 | 4 | 0.624 | |
| po3 | Level of bureaucracy in the decision making process. | | 4 | 3 | 3 | 5 | 3 | 5 | 5 | 4 | 4 | 3 | 4 | 5 | 5 | 2 | 4 | 5 | 3 | 3 | 3 | 3 | 2 | 5 | 4 | 4 | 4 | 0.760 | |
| po4 | Attitude to cost e.g. excessive desire to drive down cost | | 3 | 3 | 3 | 4 | 2 | 3 | 4 | 3 | 4 | 4 | 4 | 5 | 3 | 1 | 3 | 5 | 4 | 2 | 4 | 4 | 5 | 5 | 3 | 4 | 2 | 0.696 | |
| po5 | Top level commitment | | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 4 | 4 | 5 | 0.920 | |
| po6 | Team collaboration and commitment | | 5 | 4 | 4 | 5 | 4 | 3 | 4 | 4 | 5 | 4 | 4 | 5 | 3 | 4 | 4 | 4 | 4 | 4 | 3 | 5 | 4 | 5 | 4 | 4 | 5 | 0.832 | |
| po7 | Open/frank and flexible communication during negotiations. | | 5 | 4 | 4 | 5 | 5 | 5 | 3 | 4 | 5 | 5 | 4 | 5 | 3 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 5 | 3 | 4 | 3 | 0.840 | |
| po8 | Pre-established PPP Unit | | 4 | 3 | 3 | 5 | 4 | 4 | 5 | 3 | 3 | 3 | 4 | 3 | 4 | 2 | 4 | 5 | 3 | 3 | 3 | 4 | 1 | 5 | 2 | 4 | 5 | 0.712 | |
| po9 | Assisting in land acquisition and in obtaining permits | | 4 | 2 | 4 | 5 | 4 | 4 | 3 | 3 | 4 | 2 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 5 | 5 | 5 | 4 | 4 | 2 | 0.704 | |
| po10 | Tapping knowledge and expertise gained elsewhere | | 4 | 3 | 4 | 5 | 5 | 4 | 3 | 4 | 3 | 2 | 4 | 4 | 2 | 4 | 4 | 3 | 3 | 2 | 3 | 5 | 5 | 5 | 2 | 2 | 3 | 0.704 | |
| po11 | Commitment to earlier negotiated terms | | 4 | 3 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 3 | | 4 | 4 | 4 | 3 | 3 | 5 | 4 | 4 | 4 | 5 | 5 | 4 | 3 | 3 | 0.736 | |
| po12 | Ability to accept and absorb risks | | 5 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | 2 | 2 | 3 | 3 | 4 | 3 | 2 | 4 | 5 | 5 | 2 | 3 | 2 | 0.696 | |
| | | | 52 | 40 | 44 | 54 | 48 | 43 | 46 | 43 | 50 | 38 | 45 | 50 | 40 | 34 | 43 | 49 | 45 | 37 | 37 | 51 | 51 | 60 | 35 | 42 | 41 | | |
| | **Technical Capabilities** | | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.753** |
| pt1 | Strong in-house expertise | | 5 | 5 | 5 | 5 | 3 | 5 | 3 | 4 | 4 | 3 | 4 | 2 | 3 | 3 | 4 | 5 | 3 | 3 | 1 | 5 | 5 | 5 | 2 | 4 | 5 | 0.768 | |
| pt2 | Sound preparatory work | | 5 | 3 | 5 | 3 | 4 | 3 | 3 | 3 | 4 | 2 | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 3 | 3 | 5 | 5 | 5 | 3 | 3 | 4 | 0.768 | |
| pt3 | Previous experience in PPP procurement | | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 5 | 4 | 3 | 4 | 4 | 3 | 2 | 4 | 4 | 3 | 4 | 3 | 5 | 4 | 5 | 2 | 3 | 4 | 0.752 | |
| pt4 | Experience in infrastructure procurement | | 4 | 3 | 4 | 2 | 4 | 2 | 3 | 5 | 4 | 3 | 4 | 3 | 3 | 3 | 4 | 3 | 3 | 4 | 2 | 5 | 4 | 5 | 3 | 3 | 2 | 0.680 | |
| pt5 | Clear established evaluation criteria | | 4 | 3 | 5 | 3 | 3 | 3 | 4 | 2 | 4 | 3 | 4 | 4 | 5 | 3 | 4 | 5 | 5 | 3 | 3 | 5 | 4 | 5 | 3 | 2 | 4 | 0.744 | |
| pt6 | Clear output specifications | | 4 | 5 | 4 | 3 | 3 | 4 | 4 | 3 | 5 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 4 | 4 | 2 | 4 | 5 | 4 | 4 | 4 | 0.808 | |
| pt7 | The use of standard bidding documents | | 4 | 3 | 5 | 3 | 4 | 4 | 5 | 5 | 3 | 2 | 4 | 5 | 4 | 4 | 4 | 5 | 3 | 3 | 4 | 4 | 4 | 5 | 2 | 2 | 3 | 0.752 | |
| | | | 30 | 26 | 32 | 24 | 25 | 25 | 25 | 27 | 28 | 20 | 28 | 27 | 26 | 24 | 29 | 31 | 26 | 24 | 20 | 31 | 30 | 35 | 19 | 21 | 26 | | |
| | **Financial Capabilities** | | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.578** |
| pf1 | Ability to raise funds through Bonds. | | 3 | 2 | 2 | 1 | 2 | 1 | 3 | 4 | 4 | 2 | 3 | 3 | 1 | 1 | 3 | 4 | 3 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 0.416 | |
| pf2 | Strong financial support/guarantees from the central govt | | 4 | 3 | 4 | 4 | 4 | 1 | 3 | 4 | 4 | 4 | 5 | 3 | 4 | 5 | 4 | 4 | 5 | 1 | 3 | 5 | 4 | 5 | 3 | 4 | 4 | 0.752 | |
| pf3 | Flexible tax regimes. | | 3 | 3 | 4 | 1 | 2 | 1 | 3 | 4 | 4 | 2 | 3 | 4 | 4 | 1 | 4 | 4 | 3 | 1 | 2 | 1 | 4 | 3 | 1 | 1 | 1 | 0.512 | |
| pf4 | Ability to provide equity finance. | | 4 | 1 | 4 | 1 | 2 | 1 | 4 | 1 | 3 | 2 | 3 | 5 | 1 | 1 | 3 | 4 | 3 | 1 | 1 | 1 | 5 | 1 | 1 | 1 | 1 | 0.440 | |
| pf5 | Capability to pay | | 5 | 4 | 5 | 5 | 4 | 1 | 3 | 4 | 5 | 4 | 3 | 3 | 4 | 1 | 4 | 4 | 3 | 5 | 3 | 5 | 1 | 5 | 5 | 5 | 5 | 0.768 | |
| | | | 19 | 13 | 19 | 12 | 14 | 5 | 16 | 17 | 20 | 14 | 17 | 18 | 14 | 9 | 18 | 20 | 17 | 10 | 10 | 13 | 16 | 15 | 11 | 12 | 12 | | |

***Notes***

$$(i_{sub}) = \sum_{i=1}^{n} r/(r^* xn)$$

$$(i_{main}) = \sum_{i=1}^{n} r/(r^* xnxN)$$

where $(i_{sub})$ = the relative significance index for the sub-attributes;
$(i_{main})$ = the relative significance index for the main attributes;
r = the degree of significance assigned by each respondent to the *i* th attribute;
r* = the ideal or anchor score i.e. highest score (5 in this case);
n = the number of responses;
N = the total number of sub-attributes under each main attribute.

## Public Sector rating of Public Sector Attributes

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| Attributes | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | project ID | 40 | 38 | 31 | 12 | 3 | 42 | 41 | 39 | 34 | 32 | 27 | 9 | 8 | 5 | 17 | 11 | 7 | 37 | 20 | 18 | 43 | 24 | 16 | 4 | | |
| | respondents | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | | |
| | project type | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | off | stl | rdt/b | rdt | rlt | w/s | rlt | rlt | isub | imain |
| | **Organisational Capabilities** | | | | | | | | | | | | | | | | | | | | | | | | | | **0.721** |
| po1 | Ability to effectively sensitise public opinion on the project. | 2 | 3 | 4 | 4 | 4 | 2 | 3 | 3 | 1 | 3 | 4 | 4 | 5 | 3 | 3 | 3 | 4 | 3 | 5 | 3 | 3 | 1 | 4 | 4 | 0.650 | |
| po2 | Level of reputation enjoyed by the organisation. | 2 | 4 | 3 | 3 | 4 | 3 | 3 | 2 | 1 | 3 | 4 | 4 | 4 | 2 | 5 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 0.642 | |
| po3 | Level of bureaucracy in the decision making process. | 4 | 4 | 4 | 2 | 3 | 4 | 3 | 3 | 4 | 4 | 5 | 3 | 3 | 2 | 4 | 5 | 5 | 4 | 4 | 3 | 5 | 2 | 4 | 4 | 0.733 | |
| po4 | Attitude to cost e g excessive desire to drive down cost | 4 | 3 | 4 | 2 | 3 | 3 | 4 | 4 | 1 | 4 | 5 | 4 | 3 | 3 | 2 | 5 | 5 | 3 | 3 | 4 | 3 | 3 | 4 | 4 | 0.692 | |
| po5 | Top level commitment | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 1 | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 3 | 5 | 4 | 0.883 | |
| po6 | Team collaboration and commitment | 4 | 3 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 3 | 5 | 5 | 4 | 4 | 5 | 3 | 5 | 4 | 0.900 | |
| po7 | Open/frank and flexible communication during negotiations. | 5 | 3 | 5 | 4 | 4 | 4 | 4 | 5 | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 3 | 5 | 3 | 4 | 5 | 5 | 3 | 4 | 4 | 0.858 | |
| po8 | Pre-established PPP Unit | 4 | 4 | 5 | 2 | 2 | 2 | 1 | 3 | 1 | 3 | 4 | 3 | 3 | 2 | 1 | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 2 | 4 | 0.558 | |
| po9 | Assisting in land acquisition and in obtaining permits | 4 | 2 | 3 | 3 | 4 | 5 | 3 | 3 | 3 | 3 | 4 | 5 | 4 | 1 | 5 | 4 | 3 | 1 | 4 | 4 | 3 | 4 | 4 | 4 | 0.692 | |
| po10 | Tapping knowledge and expertise gained elsewhere | 3 | 4 | 2 | 4 | 3 | 1 | 2 | 2 | 3 | 3 | 2 | 3 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 1 | 4 | 4 | 0.625 | |
| po11 | Commitment to earlier negotiated terms | 3 | 3 | 4 | 4 | 5 | 3 | 3 | 3 | 1 | 4 | | 4 | 5 | 3 | 3 | 5 | 5 | 4 | 3 | 5 | 4 | 1 | 3 | 4 | 0.683 | |
| po12 | Ability to accept and absorb risks | 3 | 4 | 5 | 3 | 4 | 3 | 5 | 3 | 3 | 5 | 4 | 4 | 4 | 1 | 4 | 2 | 5 | 3 | 3 | 5 | 4 | 4 | 3 | 4 | 0.733 | |
| | | 42 | 41 | 49 | 40 | 45 | 40 | 41 | 41 | 27 | 47 | 47 | 47 | 50 | 34 | 45 | 45 | 53 | 41 | 44 | 47 | 47 | 32 | 46 | 47 | | |
| | **Technical Capabilities** | | | | | | | | | | | | | | | | | | | | | | | | | | **0.724** |
| pt1 | Strong in-house expertise | 2 | 4 | 1 | 4 | 3 | 4 | 5 | 4 | 5 | 4 | 4 | 3 | 5 | 1 | 4 | 5 | 4 | 5 | 3 | 5 | 3 | 4 | 4 | 4 | 0.750 | |
| pt2 | Sound preparatory work | 2 | 4 | 2 | 4 | 4 | 4 | 5 | 3 | 5 | 4 | 2 | 3 | 5 | 3 | 4 | 5 | 4 | 4 | 4 | 4 | 5 | 3 | 3 | 4 | 0.750 | |
| pt3 | Previous experience in PPP procurement | 2 | 4 | 1 | 5 | 2 | 4 | 5 | 3 | 1 | 3 | 3 | 3 | 2 | 1 | 2 | 3 | 4 | 3 | 3 | 5 | 3 | 3 | 3 | 4 | 0.600 | |
| pt4 | Experience in infrastructure procurement | 3 | 3 | 4 | 3 | 4 | 4 | 3 | 2 | 5 | 4 | 3 | 3 | 5 | 3 | 2 | 3 | 5 | 3 | 5 | 5 | 3 | 3 | 4 | 4 | 0.717 | |
| pt5 | Clear established evaluation criteria | 3 | 4 | 3 | 4 | 5 | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 2 | 5 | 4 | 5 | 4 | 4 | 3 | 5 | 3 | 5 | 4 | 0.775 | |
| pt6 | Clear output specifications | 3 | 5 | 5 | 4 | 5 | 4 | 3 | 4 | 5 | 4 | 4 | 3 | 4 | 4 | 5 | 2 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 0.850 | |
| pt7 | The use of standard bidding documents | 4 | 2 | 3 | 2 | 1 | 4 | 3 | 3 | 2 | 4 | 4 | 3 | 3 | 2 | 1 | 3 | 5 | 4 | 3 | 5 | 4 | 3 | 3 | 4 | 0.625 | |
| | | 19 | 26 | 19 | 26 | 24 | 28 | 27 | 22 | 26 | 27 | 24 | 22 | 29 | 16 | 23 | 25 | 32 | 28 | 28 | 32 | 28 | 24 | 27 | 28 | | |
| | **Financial Capabilities** | | | | | | | | | | | | | | | | | | | | | | | | | | **0.578** |
| pf1 | Ability to raise funds through Bonds. | 3 | 3 | 5 | 1 | 2 | 1 | 3 | 3 | 1 | 3 | 2 | 1 | 1 | 1 | 1 | 4 | 4 | 5 | 1 | 3 | 3 | 1 | 4 | 4 | 0.500 | |
| pf2 | Strong financial support/guarantees from the central govt | 3 | 4 | 5 | 1 | 5 | 5 | 5 | 3 | 5 | 5 | 5 | 5 | 5 | 2 | 1 | 4 | 3 | 5 | 4 | 4 | 3 | 1 | 2 | 4 | 0.742 | |
| pf3 | Flexible tax regimes. | 3 | 3 | 1 | 2 | 1 | 1 | 2 | 3 | 1 | 3 | 2 | 1 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 2 | 3 | 1 | 2 | 4 | 0.417 | |
| pf4 | Ability to provide equity finance. | 4 | 2 | 1 | 1 | 5 | 1 | 3 | 2 | 1 | 3 | 2 | 1 | 1 | 1 | 5 | 3 | 3 | 3 | 1 | 4 | 1 | 1 | 5 | 2 | 0.467 | |
| pf5 | Capability to pay | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 2 | 5 | 3 | 5 | 5 | 5 | 1 | 5 | 4 | 4 | 2 | 1 | 5 | 5 | 1 | 5 | 2 | 0.767 | |
| | | 17 | 16 | 17 | 9 | 18 | 13 | 18 | 13 | 13 | 17 | 16 | 13 | 13 | 6 | 13 | 18 | 17 | 18 | 10 | 18 | 15 | 5 | 18 | 16 | | |

***Notes***

$$(i_{sub}) = \sum_{i=1}^{n} r/(r^* x n)$$

$$(i_{main}) = \sum_{i=1}^{n} r/(r^* x n x N)$$

where $(i_{sub})$ = the relative significance index for the sub-attributes;
$(i_{main})$ = the relative significance index for the main attributes;
r = the degree of significance assigned by each respondent to the *i* th attribute;
r* = the ideal or anchor score i.e. highest score (5 in this case);
n = the number of responses;
N = the total number of sub-attributes under each main attribute.

Appendix D

## Testing of hypothesis 3: agreement between the private and public sectors - *Public Sector Attributes*

| | | overall rating *n* = 49 | | | | private sector rating *n* = 25 | | | | public sector rating *n* = 24 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $I_{sub}$ | $r_{sub}$ | $I_{main}$ | $r_{main}$ | $I_{sub}$ | $r_{sub}$ | $I_{main}$ | $r_{main}$ | $I_{sub}$ | $r_{sub}$ | $I_{main}$ | $r_{main}$ |
| | **Organisational Capabilities** | | | 0.736 | 2 | | | 0.749 | 2 | | | 0.724 | 1.5 |
| po1 | Ability to effectively sensitise public opinion on the project. | 0.686 | 9 | | | 0.720 | 8 | | | 0.650 | 9 | | |
| po2 | Level of reputation enjoyed by the organisation. | 0.633 | 12 | | | 0.624 | 12 | | | 0.642 | 10 | | |
| po3 | Level of bureaucracy in the decision making process. | 0.747 | 4.5 | | | 0.760 | 5 | | | 0.733 | 4.5 | | |
| po4 | Attitude to cost e.g. excessive desire to drive down cost | 0.694 | 8 | | | 0.696 | 10.5 | | | 0.692 | 7.5 | | |
| po5 | Top level commitment | 0.902 | 1 | | | 0.920 | 1 | | | 0.883 | 2 | | |
| po6 | Team collaboration and commitment | 0.865 | 2 | | | 0.832 | 3 | | | 0.900 | 1 | | |
| po7 | Open/frank and flexible communication during negotiations. | 0.849 | 3 | | | 0.840 | 2 | | | 0.858 | 3 | | |
| po8 | Pre-established PPP Unit | 0.637 | 11 | | | 0.712 | 7 | | | 0.558 | 12 | | |
| po9 | Assisting in land acquisition and in obtaining permits | 0.698 | 7 | | | 0.704 | 8.5 | | | 0.692 | 7.5 | | |
| po10 | Tapping knowledge and expertise gained elsewhere | 0.665 | 10 | | | 0.704 | 8.5 | | | 0.625 | 11 | | |
| po11 | Commitment to earlier negotiated terms | 0.747 | 4.5 | | | 0.776 | 4 | | | 0.717 | 6 | | |
| po12 | Ability to accept and absorb risks | 0.714 | 6 | | | 0.696 | 10.5 | | | 0.733 | 4.5 | | |
| | **Technical Capabilities** | | | 0.739 | 1 | | | 0.753 | 1 | | | 0.724 | 1.5 |
| pt1 | Strong in-house expertise | 0.759 | 3 | | | 0.768 | 2.5 | | | 0.750 | 3.5 | | |
| pt2 | Sound preparatory work | 0.759 | 3 | | | 0.768 | 2.5 | | | 0.750 | 3.5 | | |
| pt3 | Previous experience in PPP procurement | 0.678 | 7 | | | 0.752 | 4.5 | | | 0.600 | 7 | | |
| pt4 | Experience in infrastructure procurement | 0.698 | 5 | | | 0.680 | 7 | | | 0.717 | 5 | | |
| pt5 | Clear established evaluation criteria | 0.759 | 3 | | | 0.744 | 6 | | | 0.775 | 2 | | |
| pt6 | Clear output specifications | 0.829 | 1 | | | 0.808 | 1 | | | 0.850 | 1 | | |
| pt7 | The use of standard bidding documents | 0.690 | 6 | | | 0.752 | 4.5 | | | 0.625 | 6 | | |
| | **Financial Capabilities** | | | 0.578 | 3 | | | 0.578 | 3 | | | 0.578 | 3 |
| pf1 | Ability to raise funds through Bonds. | 0.457 | 4 | | | 0.416 | 5 | | | 0.500 | 3 | | |
| pf2 | Strong financial support/guarantees from the central govt | 0.747 | 2 | | | 0.752 | 2 | | | 0.742 | 2 | | |
| pf3 | Flexible tax regimes. | 0.465 | 3 | | | 0.512 | 3 | | | 0.417 | 5 | | |
| pf4 | Ability to provide equity finance. | 0.453 | 5 | | | 0.440 | 4 | | | 0.467 | 4 | | |
| pf5 | Capability to pay | 0.767 | 1 | | | 0.768 | 1 | | | 0.767 | 1 | | |

$r_{sub}$:- ranking of the sub-attribute
$I_{main}$:- relative significance index of the main attributes
$r_{main}$:- ranking of the main attributes
rho - spearmam's rank correlation coefficient

| | *rho* |
|---|---|
| $rho_{privatepublic}$ for organisational capabilities | *0.646* |
| $rho_{privatepublic}$ for technical capabilities | *0.440* |
| $rho_{privatepublic}$ for financial capabilities | *0.600* |

$rhoav_{privatepublic\text{-}publicsectorattr.}$ 0.562

At 0.005 level of significance with N=24,
*rho critical* from statistical tables is 0.521

Since 0.562 is greater than 0.521 *Ho* is rejected

For N = 24, *rhoav* = 0.562 from the statistical tables shows that a value as large as this is significant at $p < 0.0025$ level (one-tail test). Thus we could reject *Ho* at $\alpha = 0.0025$ level.

**Further check using Kendall's Coefficient of Concordance**

From the relationship $\boxed{rhoav = \frac{kW-1}{k-1}}$

where
*W* = Kendall Coefficient of Concordance (level of agreement)
*k* = is the sets of ranking (= 2)

*Hence* $\boxed{W = \frac{rhoav(k-1)+1}{k}}$

W = *0.781*

again $\boxed{\chi 2 = k(N-1)W}$

with N = 24

$\boxed{\chi 2 =}$ 35.930

From statistical tables we find that $\boxed{\chi\ 1}\ \boxed{\geq}$ 35.930 with a *df* = N - 1 = 23 has a probability of occurrence under *Ho* of $p < 0.100$. Hence it can be concluded with considerable assurance that the agreement between the public and private is higher than it will be by chance.

The very low probability under the Ho associated with the observed value of W enables us to reject the null hypothesis that the ratings for the sets are unrelated. Hence we accept the alternative hypothesis that the ratings are related.

## General Rating of project Attributes

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | project ID | 50 | 49 | 40 | 38 | 33 | 31 | 29 | 19 | 15 | 13 | 12 | 3 | 2 | 1 | 48 | 47 | 46 | 45 | 42 | 41 | 39 | 35 | 34 | 32 | 28 | 27 | 23 | 14 | 9 | 8 | 6 | 5 | 21 | 17 | 11 | 7 | 44 | 37 | 30 | 22 | 20 | 18 | 43 | 36 | 26 | 24 | 16 | 10 | 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondents | pr | pr | pu | pu | pr | pu | pr | pr | pr | pr | pu | pu | pr | pr | pr | pr | pr | pr | pu | pu | pu | pu | pu | pu | pr | pu | pr | pr | pu | pu | pr | pu | pu | pu | pu | pr | pu | pr | pr | pu | pu | pu | pr | pr | pu | pu | pr | pu | | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | off | off | rdt | stl | rdt | rdt | rdt/b | rdt | rlt | fld | fld | wls | rlt | wls | rlt | | | |
| | **Attributes** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **isub** | **imain** |
| | **Nature of Project** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.664** |
| pn1 | Size and complexity | 4 | 2 | 4 | 4 | 3 | 5 | 5 | 3 | 5 | 5 | 4 | 4 | 4 | 4 | 2 | 3 | 5 | 4 | 4 | 5 | 4 | 5 | 5 | 3 | 2 | 5 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 5 | 4 | 5 | 4 | 4 | 5 | 5 | 2 | 4 | 4 | 5 | 3 | 5 | 3 | 5 | 3 | | **0.788** | |
| pn2 | Amenability to innovation. | 3 | 2 | 3 | 3 | 5 | 2 | 3 | 4 | 1 | 3 | 4 | 3 | 1 | 3 | 3 | 3 | 4 | 3 | 2 | 3 | 3 | 2 | 1 | 3 | 3 | 2 | 5 | 3 | 3 | 4 | 4 | 3 | 2 | 5 | 2 | 5 | 3 | 3 | 5 | 5 | 3 | 4 | 4 | 4 | 4 | 1 | 3 | 3 | 3 | | **0.624** | |
| pn3 | Project risk management | 5 | 3 | 4 | 3 | 4 | 4 | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 2 | 4 | 4 | 3 | 4 | 3 | 5 | 3 | 3 | 5 | 5 | 3 | 4 | 4 | 4 | 4 | 5 | 3 | 5 | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 3 | 4 | 3 | 3 | 3 | 3 | | **0.759** | |
| pn4 | Impact of project on the environment. | 4 | 4 | 3 | 2 | 4 | 1 | 3 | 4 | 4 | 3 | 2 | 3 | 2 | 4 | 3 | 2 | 4 | 2 | 3 | 3 | 4 | 1 | 5 | 3 | 4 | 4 | 5 | 3 | 3 | 4 | 3 | 2 | 3 | 3 | 1 | 5 | 3 | 2 | 5 | 5 | 4 | 4 | 4 | 2 | 5 | 1 | 3 | 1 | 3 | | **0.633** | |
| pn5 | Need for a third party to improve existing infrastructure. | 4 | 3 | 3 | 4 | 3 | 1 | 3 | 5 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 4 | 2 | 3 | 4 | 4 | 1 | 1 | 3 | 3 | 5 | 3 | 2 | 5 | 4 | 3 | 3 | 2 | 1 | 2 | 3 | 2 | 3 | 4 | 5 | 1 | 5 | 3 | 1 | 1 | 2 | 3 | 2 | 3 | | **0.563** | |
| pn6 | Health and safety provoked by the project's development. | 4 | 3 | 3 | 2 | 3 | 4 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 4 | 2 | 3 | 4 | 2 | 3 | 3 | 2 | 1 | 5 | 3 | 3 | 3 | 4 | 3 | 4 | 4 | 3 | 3 | 1 | 2 | 3 | 4 | 2 | 3 | 5 | 5 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | | **0.584** | |
| pn7 | Level of design completion required at tender. | 4 | 2 | 3 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 3 | 4 | 4 | 3 | 5 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 3 | 4 | 2 | 4 | 3 | 3 | 4 | 2 | 2 | 2 | 5 | 2 | 3 | 5 | 5 | 3 | 4 | 3 | 3 | 3 | 3 | 2 | 3 | | **0.702** | |
| pn8 | Ability of project to respond to future changes. | 3 | 3 | 3 | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 4 | 5 | 3 | 5 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 3 | 5 | 5 | 3 | 3 | 4 | 3 | 3 | 3 | 5 | 4 | 5 | 2 | 3 | 5 | 5 | 2 | 5 | 4 | 3 | 4 | 2 | 4 | 5 | 2 | | **0.759** | |
| pn9 | Project location and site conditions. | 3 | 2 | 3 | 2 | 3 | 5 | 3 | 3 | 4 | 4 | 3 | 4 | 4 | 3 | 4 | 2 | 5 | 3 | 3 | 4 | 4 | 4 | 5 | 3 | 4 | 4 | 3 | 3 | 5 | 3 | 4 | 4 | 3 | 5 | 5 | 3 | 2 | 3 | 5 | 5 | 3 | 4 | 4 | 1 | 5 | 1 | 3 | 2 | 3 | | **0.694** | |
| pn10 | Uniqueness of project. | 3 | 2 | 4 | 2 | 4 | 4 | 3 | 4 | 3 | 4 | 2 | 2 | 4 | 3 | 5 | 2 | 2 | 2 | 1 | 5 | 4 | 1 | 2 | 3 | 4 | 3 | 4 | 3 | 3 | 3 | 4 | 3 | 3 | 1 | 5 | 5 | 2 | 5 | 5 | 5 | 2 | 2 | 3 | 1 | 5 | 1 | 2 | 5 | 3 | | **0.624** | |
| pn11 | Effect on existing public sector staff | 4 | 4 | 3 | 4 | 4 | 5 | 1 | 5 | 3 | 3 | | 2 | 3 | 4 | 3 | 2 | 3 | 2 | 3 | 1 | 4 | 4 | 2 | 4 | 5 | 3 | 3 | 2 | 2 | 1 | 4 | 1 | 1 | 1 | 1 | 3 | 5 | 2 | 5 | 5 | 3 | 3 | 3 | 4 | 2 | 2 | 2 | 2 | 1 | 3 | | **0.576** | |
| | | 41 | 30 | 36 | 35 | 43 | 39 | 35 | 43 | 36 | 42 | 31 | 34 | 31 | 41 | 36 | 29 | 44 | 29 | 33 | 40 | 39 | 31 | 36 | 37 | 38 | 40 | 45 | 32 | 38 | 38 | 39 | 33 | 27 | 35 | 34 | 50 | 27 | 38 | 54 | 53 | 31 | 43 | 41 | 27 | 38 | 24 | 31 | 32 | 31 | | | |
| | **Marketability of Project** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.656** |
| pm1 | Suitability for private participation. | 4 | 4 | 5 | 4 | 5 | 3 | 3 | 5 | 3 | 4 | 4 | 5 | 5 | 5 | 3 | 4 | 5 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 3 | 4 | 4 | 5 | 4 | 4 | 5 | 2 | 4 | 5 | 2 | 5 | 5 | 5 | 5 | 5 | 3 | 4 | 5 | 4 | 3 | 4 | 3 | 5 | 3 | | **0.824** | |
| pm2 | Level to which project must meet general public needs | 4 | 2 | 5 | 4 | 3 | 5 | 2 | 5 | 1 | 4 | 4 | 5 | 3 | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 3 | 1 | 5 | 4 | 3 | 5 | 5 | 3 | 5 | 5 | 3 | 4 | 3 | 5 | 5 | 5 | 4 | 4 | 5 | 5 | 4 | 4 | 5 | 4 | 4 | 5 | 4 | 1 | 3 | | **0.755** | |
| pm3 | Possible land and property deals and buyouts. | 3 | 4 | 4 | 3 | 4 | 2 | 5 | 4 | 2 | 3 | 2 | 1 | 2 | 3 | 2 | 2 | 4 | 3 | 3 | 4 | 3 | 4 | 2 | 4 | 3 | 2 | 3 | 3 | 4 | 4 | 3 | 3 | 2 | 5 | 5 | 5 | 4 | 4 | 5 | 3 | 5 | 3 | 3 | 3 | 1 | 1 | 2 | 4 | 3 | | **0.637** | |
| pm4 | Useful life at the end of concession period. | 4 | 2 | 5 | 4 | 3 | 1 | 1 | 4 | 2 | 3 | 3 | 4 | 1 | 4 | 3 | 3 | 5 | 3 | 3 | 4 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 2 | 3 | 5 | 3 | 3 | 2 | 2 | 5 | 5 | 4 | 5 | 1 | 5 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 4 | 3 | | **0.661** | |
| pm5 | Bankability of project | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 1 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 5 | 4 | 1 | 4 | 5 | 4 | 4 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 1 | 5 | 5 | 5 | 3 | | **0.890** | |
| pm6 | Monopolistic advantage | 4 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 4 | 3 | 2 | 1 | 2 | 4 | 2 | 3 | 4 | 3 | 3 | 3 | 3 | 1 | 1 | 3 | 4 | 1 | 3 | 3 | 3 | 2 | 3 | 1 | 1 | 1 | 3 | 3 | 2 | 4 | 5 | 5 | 2 | 3 | 3 | 3 | 3 | 4 | 2 | 2 | 3 | | **0.539** | |
| pm7 | Ability of project to generate third party revenue. | 3 | 2 | 4 | 3 | 3 | 1 | 1 | 3 | 2 | 3 | 2 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 1 | 3 | 3 | 1 | 1 | 3 | 3 | 2 | 3 | 2 | 2 | 1 | 2 | 1 | 1 | 5 | 2 | 3 | 3 | 2 | 2 | 5 | 3 | 1 | 3 | 2 | 1 | 1 | 1 | 3 | 2 | | **0.453** | |
| pm8 | Opportunities for future refinancing | 4 | 3 | 4 | 3 | 3 | 2 | 1 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 4 | 5 | 3 | 3 | 3 | 3 | 1 | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 4 | 3 | 2 | 3 | 5 | 3 | 3 | 3 | 3 | 5 | 3 | 1 | 3 | 3 | 2 | 3 | 1 | 2 | 4 | 3 | | **0.584** | |
| pm9 | Potential for property development rights | 3 | 3 | 4 | 4 | 3 | 1 | 1 | 3 | 2 | 3 | 3 | 1 | 2 | 2 | 2 | 3 | 5 | 4 | 1 | 2 | 2 | 3 | 1 | 2 | 3 | 1 | 3 | 2 | 1 | 3 | 2 | 1 | 2 | 5 | 5 | 3 | 3 | 1 | 5 | 3 | 1 | 4 | 2 | 1 | 1 | 1 | 2 | 3 | 3 | | **0.494** | |
| pm10 | Level of tariffs and tolls. | 4 | 3 | 4 | 4 | 3 | 5 | 3 | 2 | 4 | 3 | 4 | 5 | 5 | 4 | 2 | 3 | 4 | 4 | 5 | 5 | 2 | 1 | 5 | 3 | 2 | 5 | 3 | 2 | 4 | 4 | 5 | 1 | 3 | 4 | 3 | 5 | 5 | 1 | 5 | 5 | 5 | 3 | 4 | 5 | 2 | 3 | 4 | 4 | 3 | | **0.722** | |
| | | 38 | 30 | 43 | 35 | 34 | 28 | 25 | 36 | 27 | 34 | 31 | 30 | 29 | 35 | 23 | 33 | 43 | 35 | 32 | 37 | 29 | 24 | 31 | 36 | 32 | 31 | 36 | 29 | 29 | 36 | 34 | 22 | 25 | 41 | 34 | 42 | 38 | 33 | 46 | 42 | 30 | 36 | 36 | 31 | 23 | 28 | 31 | 34 | 30 | | | |

***Note***

$$(isub) = \sum_{i=1}^{n} r/(r^* xn)$$

$$(imain) = \sum_{i=1}^{n} r/(r^* xnxN)$$

where $(isub)$ = the relative significance index for the sub-attributes;
$(imain)$ = the relative significance index for the main attributes;
r = the degree of significance assigned by each respondent to the *i* th attribute;
r* = the ideal or anchor score i.e. highest score (5 in this case);
n = the number of responses;
N = the total number of sub-attributes under each main attribute.

## Private Sector rating of Project Attributes

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

**Attributes**

| | project ID | 50 | 49 | 33 | 29 | 19 | 15 | 13 | 2 | 1 | 48 | 47 | 46 | 45 | 35 | 28 | 23 | 14 | 6 | 21 | 44 | 30 | 22 | 18 | 43 | 24 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondents | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | rdt | rdt | rdt | fld | fld | w/s | | |
| | **Attributes** | | | | | | | | | | | | | | | | | | | | | | | | | | **isub** | **imain** |
| | **Nature of Project** | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.670** |
| pn1 | Size and complexity | 4 | 2 | 3 | 5 | 3 | 5 | 5 | 4 | 4 | 2 | 3 | 5 | 4 | 5 | 2 | 4 | 3 | 4 | 3 | 4 | 5 | 5 | 5 | 3 | 5 | **0.776** | |
| pn2 | Amenability to innovation. | 3 | 2 | 5 | 3 | 4 | 1 | 3 | 1 | 3 | 3 | 3 | 4 | 3 | 2 | 3 | 5 | 3 | 4 | 2 | 3 | 5 | 5 | 4 | 4 | 3 | **0.648** | |
| pn3 | Project risk management | 5 | 3 | 4 | 3 | 3 | 3 | 5 | 3 | 4 | 4 | 4 | 4 | 2 | 4 | 3 | 5 | 5 | 4 | 4 | 3 | 5 | 5 | 3 | 4 | 3 | **0.760** | |
| pn4 | Impact of project on the environment. | 4 | 4 | 4 | 3 | 4 | 4 | 3 | 2 | 4 | 3 | 2 | 4 | 2 | 1 | 4 | 5 | 3 | 3 | 3 | 3 | 5 | 5 | 2 | 5 | 1 | **0.664** | |
| pn5 | Need for a third party to improve existing infrastructure. | 4 | 3 | 3 | 3 | 5 | 2 | 3 | 2 | 3 | 3 | 2 | 4 | 2 | 1 | 3 | 3 | 2 | 3 | 2 | 2 | 4 | 5 | 1 | 1 | 2 | **0.544** | |
| pn6 | Health and safety provoked by the project's development. | 4 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 4 | 2 | 3 | 4 | 2 | 1 | 3 | 4 | 3 | 3 | 1 | 2 | 5 | 5 | 2 | 2 | 2 | **0.560** | |
| pn7 | Level of design completion required at tender. | 4 | 2 | 5 | 5 | 4 | 4 | 4 | 3 | 4 | 4 | 3 | 5 | 3 | 4 | 4 | 4 | 2 | 3 | 2 | 2 | 5 | 5 | 3 | 3 | 3 | **0.720** | |
| pn8 | Ability of project to respond to future changes. | 3 | 3 | 5 | 4 | 5 | 5 | 5 | 3 | 5 | 3 | 3 | 4 | 4 | 4 | 3 | 5 | 3 | 3 | 3 | 2 | 5 | 5 | 3 | 4 | 5 | **0.776** | |
| pn9 | Project location and site conditions. | 3 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 4 | 2 | 5 | 3 | 4 | 4 | 3 | 3 | 4 | 3 | 2 | 5 | 5 | 1 | 5 | 2 | **0.672** | |
| pn10 | Uniqueness of project. | 3 | 2 | 4 | 3 | 4 | 3 | 4 | 4 | 3 | 5 | 2 | 2 | 2 | 1 | 4 | 4 | 3 | 4 | 3 | 2 | 5 | 5 | 1 | 5 | 5 | **0.664** | |
| pn11 | Effect on existing public sector staff | 4 | 4 | 4 | 1 | 5 | 3 | 3 | 3 | 4 | 3 | | 3 | 2 | 4 | 5 | 3 | 2 | 4 | 1 | 2 | 5 | 3 | 2 | 2 | 1 | **0.584** | |
| | | 41 | 30 | 43 | 35 | 43 | 36 | 42 | 31 | 41 | 36 | 27 | 44 | 29 | 31 | 38 | 45 | 32 | 39 | 27 | 27 | 54 | 53 | 27 | 38 | 32 | | |
| | **Marketability of Project** | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.653** |
| pm1 | Suitability for private participation. | 4 | 4 | 5 | 3 | 5 | 3 | 4 | 5 | 5 | 3 | 4 | 5 | 4 | 5 | 3 | 4 | 5 | 5 | 4 | 5 | 5 | 5 | 4 | 3 | 5 | **0.856** | |
| pm2 | Level to which project must meet general public needs. | 4 | 2 | 3 | 2 | 5 | 1 | 4 | 3 | 4 | 4 | 3 | 3 | 3 | 1 | 3 | 5 | 3 | 3 | 3 | 5 | 5 | 5 | 4 | 4 | 1 | **0.664** | |
| pm3 | Possible land and property deals and buyouts. | 3 | 4 | 4 | 5 | 4 | 2 | 3 | 2 | 3 | 2 | 2 | 4 | 3 | 4 | 3 | 3 | 3 | 3 | 2 | 4 | 5 | 3 | 3 | 1 | 4 | **0.632** | |
| pm4 | Useful life at the end of concession period. | 4 | 2 | 3 | 1 | 4 | 2 | 3 | 1 | 4 | 3 | 3 | 5 | 3 | 2 | 4 | 4 | 2 | 3 | 2 | 4 | 1 | 5 | 3 | 4 | 4 | **0.608** | |
| pm5 | Bankability of project | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 1 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 1 | 5 | **0.904** | |
| pm6 | Monopolistic advantage | 4 | 2 | 2 | 3 | 2 | 4 | 3 | 2 | 4 | 2 | 3 | 4 | 3 | 1 | 4 | 3 | 3 | 3 | 1 | 2 | 5 | 5 | 3 | 3 | 2 | **0.584** | |
| pm7 | Ability of project to generate third party revenue. | 3 | 2 | 3 | 1 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 1 | 3 | 3 | 2 | 2 | 1 | 2 | 5 | 3 | 1 | 1 | 2 | **0.464** | |
| pm8 | Opportunities for future refinancing | 4 | 3 | 3 | 1 | 3 | 3 | 3 | 2 | 2 | 2 | 4 | 5 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 5 | 3 | 2 | 3 | 4 | **0.592** | |
| pm9 | Potential for property development rights | 3 | 3 | 3 | 1 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 5 | 4 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 5 | 3 | 1 | 1 | 3 | **0.536** | |
| pm10 | Level of tariffs and tolls. | 4 | 3 | 3 | 3 | 2 | 4 | 3 | 5 | 4 | 2 | 3 | 4 | 4 | 1 | 2 | 3 | 2 | 5 | 3 | 5 | 5 | 5 | 5 | 2 | 4 | **0.688** | |
| | | 38 | 30 | 34 | 25 | 36 | 27 | 34 | 29 | 35 | 23 | 33 | 43 | 35 | 24 | 32 | 36 | 29 | 34 | 25 | 38 | 46 | 42 | 31 | 23 | 34 | | |

***Note***

$$(isub) = \sum_{i=1}^{n} r/(r^* xn)$$

$$(imain) = \sum_{i=1}^{n} r/(r^* xnxN)$$

where $(isub)$ = the relative significance index for the sub-attributes;
$(imain)$ = the relative significance index for the main attributes;
r = the degree of significance assigned by each respondent to the *i* th attribute;
r* = the ideal or anchor score i.e. highest score (5 in this case);
n = the number of responses;
N = the total number of sub-attributes under each main attribute.

## Public Sector rating of Project Attributes

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | Attributes | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | project ID | 40 | 38 | 31 | 12 | 3 | 42 | 41 | 39 | 34 | 32 | 27 | 9 | 8 | 5 | 17 | 11 | 7 | 37 | 20 | 18 | 43 | 24 | 16 | 4 | | |
| | respondents | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | | |
| | project type | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | off | stl | rdt/b | rdt | rlt | w/s | rlt | rlt | | |
| | **Attributes** | | | | | | | | | | | | | | | | | | | | | | | | | ***isub*** | ***imain*** |
| | **Nature of Project** | | | | | | | | | | | | | | | | | | | | | | | | | | **0.656** |
| pn1 | Size and complexity | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 5 | 3 | 5 | 3 | 4 | 3 | 5 | 4 | 5 | 4 | 2 | 4 | 4 | 5 | 3 | 3 | **0.800** | |
| pn2 | Amenability to innovation. | 3 | 3 | 2 | 4 | 3 | 2 | 3 | 3 | 1 | 3 | 2 | 3 | 4 | 3 | 5 | 2 | 5 | 3 | 3 | 4 | 4 | 1 | 3 | 3 | **0.600** | |
| pn3 | Project risk management | 4 | 3 | 4 | 3 | 3 | 4 | 4 | 3 | 3 | 5 | 3 | 3 | 4 | 4 | 5 | 3 | 5 | 4 | 5 | 5 | 5 | 3 | 3 | 3 | **0.758** | |
| pn4 | Impact of project on the environment. | 3 | 2 | 1 | 2 | 3 | 3 | 3 | 4 | 5 | 3 | 4 | 3 | 4 | 2 | 3 | 1 | 5 | 2 | 4 | 4 | 4 | 1 | 3 | 3 | **0.600** | |
| pn5 | Need for a third party to improve existing infrastructure. | 3 | 4 | 1 | 2 | 2 | 3 | 4 | 4 | 1 | 3 | 5 | 5 | 4 | 3 | 1 | 2 | 3 | 3 | 1 | 5 | 3 | 2 | 3 | 3 | **0.583** | |
| pn6 | Health and safety provoked by the project's development. | 3 | 2 | 4 | 2 | 2 | 3 | 3 | 2 | 5 | 3 | 3 | 4 | 4 | 3 | 2 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | **0.608** | |
| pn7 | Level of design completion required at tender. | 3 | 5 | 4 | 5 | 4 | 3 | 4 | 4 | 4 | 3 | 3 | 4 | 3 | 4 | 2 | 2 | 5 | 3 | 3 | 4 | 3 | 3 | 2 | 2 | **0.683** | |
| pn8 | Ability of project to respond to future changes. | 3 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 3 | 4 | 5 | 3 | 4 | 3 | 5 | 4 | 5 | 3 | 2 | 5 | 4 | 2 | 4 | 2 | **0.742** | |
| pn9 | Project location and site conditions. | 3 | 2 | 5 | 3 | 4 | 3 | 4 | 4 | 5 | 3 | 4 | 5 | 3 | 4 | 5 | 5 | 3 | 3 | 3 | 4 | 4 | 1 | 3 | 3 | **0.717** | |
| pn10 | Uniqueness of project. | 4 | 2 | 4 | 2 | 2 | 1 | 5 | 4 | 2 | 3 | 3 | 3 | 3 | 3 | 1 | 5 | 5 | 5 | 2 | 2 | 3 | 1 | 2 | 3 | **0.583** | |
| pn11 | Effect on existing public sector staff | 3 | 4 | 5 | 2 | 2 | 3 | 1 | 4 | 2 | 4 | | 2 | 1 | 1 | 1 | 3 | 5 | 5 | 3 | 3 | 4 | 2 | 2 | 3 | **0.542** | |
| | | 36 | 35 | 39 | 33 | 34 | 33 | 40 | 39 | 36 | 37 | 37 | 38 | 38 | 33 | 35 | 34 | 50 | 38 | 31 | 43 | 41 | 24 | 31 | 31 | | |
| | **Marketability of Project** | | | | | | | | | | | | | | | | | | | | | | | | | | **0.659** |
| pm1 | Suitability for private participation. | 5 | 4 | 3 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 2 | 5 | 2 | 5 | 5 | 3 | 4 | 5 | 4 | 3 | 3 | **0.792** | |
| pm2 | Level to which project must meet general public needs. | 5 | 4 | 5 | 4 | 5 | 4 | 4 | 3 | 5 | 4 | 5 | 5 | 5 | 4 | 4 | 2 | 5 | 4 | 4 | 4 | 5 | 5 | 4 | 3 | **0.850** | |
| pm3 | Possible land and property deals and buyouts. | 4 | 3 | 2 | 2 | 1 | 3 | 4 | 3 | 2 | 4 | 2 | 4 | 4 | 3 | 5 | 5 | 5 | 4 | 5 | 3 | 3 | 1 | 2 | 3 | **0.642** | |
| pm4 | Useful life at the end of concession period. | 5 | 4 | 1 | 3 | 4 | 3 | 4 | 2 | 2 | 4 | 4 | 3 | 5 | 3 | 2 | 5 | 5 | 5 | 4 | 4 | 4 | 3 | 4 | 3 | **0.717** | |
| pm5 | Bankability of project | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 4 | 5 | 5 | 4 | 1 | 4 | 4 | 5 | 4 | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 3 | **0.875** | |
| pm6 | Monopolistic advantage | 3 | 2 | 3 | 2 | 1 | 3 | 3 | 3 | 1 | 3 | 1 | 3 | 2 | 1 | 1 | 3 | 3 | 4 | 2 | 3 | 3 | 4 | 2 | 3 | **0.492** | |
| pm7 | Ability of project to generate third party revenue. | 4 | 3 | 1 | 2 | 1 | 1 | 3 | 3 | 1 | 3 | 2 | 2 | 1 | 1 | 5 | 2 | 3 | 2 | 1 | 3 | 2 | 1 | 3 | 3 | **0.442** | |
| pm8 | Opportunities for future refinancing | 4 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 4 | 4 | 3 | 2 | 4 | 2 | 5 | 3 | 3 | 3 | 1 | 3 | 3 | 1 | 2 | 3 | **0.575** | |
| pm9 | Potential for property development rights | 4 | 4 | 1 | 3 | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 3 | 1 | 5 | 5 | 3 | 1 | 1 | 4 | 2 | 1 | 2 | 3 | **0.450** | |
| pm10 | Level of tariffs and tolls. | 4 | 4 | 5 | 4 | 5 | 5 | 5 | 2 | 5 | 3 | 5 | 4 | 4 | 1 | 4 | 3 | 5 | 1 | 5 | 3 | 4 | 3 | 4 | 3 | **0.758** | |
| | | 43 | 35 | 28 | 31 | 30 | 32 | 37 | 29 | 31 | 36 | 31 | 29 | 36 | 22 | 41 | 34 | 42 | 33 | 30 | 36 | 36 | 28 | 31 | 30 | | |

***Note***

$$(isub) = \sum_{i=1}^{n} r/(r^* xn)$$

$$(imain) = \sum_{i=1}^{n} r/(r^* xnxN)$$

where ($isub$) = the relative significance index for the sub-attributes;
($imain$) = the relative significance index for the main attributes;
r = the degree of significance assigned by each respondent to the $i$ th attribute;
r* = the ideal or anchor score i.e. highest score (5 in this case);
n = the number of responses;
N = the total number of sub-attributes under each main attribute.

Appendix D

## Testing of hypothesis 3: agreement between the private and public sectors - *Project Attributes*

| | | overall rating *n* = 49 | | | | private sector rating *n* = 25 | | | | public sector rating *n* = 24 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $I_{sub}$ | $r_{sub}$ | $I_{mean}$ | $r_{mean}$ | $I_{sub}$ | $r_{sub}$ | $I_{mean}$ | $r_{mean}$ | $I_{sub}$ | $r_{sub}$ | $I_{mean}$ | $r_{mean}$ |
| | **Attributes** | | | | | | | | | | | | |
| | **Nature of Project** | | | 0.665 | 1 | | | 0.671 | 1 | | | 0.658 | 1 |
| pn1 | Size and complexity | 0.788 | 1 | | | 0.776 | 1 5 | | | 0.800 | 1 | | |
| pn2 | Amenability to innovation | 0.624 | 7 5 | | | 0.648 | 8 | | | 0.600 | 7.5 | | |
| pn3 | Project risk management | 0.759 | 2.5 | | | 0.760 | 3 | | | 0.758 | 2 | | |
| pn4 | Impact of project on the environment. | 0.633 | 6 | | | 0.664 | 6 5 | | | 0.600 | 7.5 | | |
| pn5 | Need for a third party to improve existing infrastructure | 0.563 | 11 | | | 0.544 | 11 | | | 0.583 | 9 5 | | |
| pn6 | Health and safety provoked by the projects development. | 0.584 | 9 5 | | | 0.560 | 10 | | | 0.608 | 6 | | |
| pn7 | Level of design completion required at tender | 0.702 | 4 | | | 0.720 | 4 | | | 0.683 | 5 | | |
| pn8 | Ability of project to respond to future changes. | 0.759 | 2 5 | | | 0.776 | 1.5 | | | 0.742 | 3 | | |
| pn9 | Project location and site conditions. | 0.694 | 5 | | | 0.672 | 5 | | | 0.717 | 4 | | |
| pn10 | Uniqueness of project | 0.624 | 7.5 | | | 0.664 | 6 5 | | | 0.583 | 9.5 | | |
| pn11 | Effect on existing public sector staff | 0.584 | 9 5 | | | 0.600 | 9 | | | 0.567 | 11 | | |
| | **Marketability of Project** | | | 0.656 | 2 | | | 0.653 | 2 | | | 0.659 | 2 |
| prm1 | Suitability for private participation | 0.824 | 2 | | | 0.856 | 2 | | | 0.792 | 3 | | |
| prm2 | Level to which project must meet general public needs | 0.755 | 3 | | | 0.664 | 4 | | | 0.850 | 2 | | |
| prm3 | Possible land and property deals and buyouts. | 0.637 | 6 | | | 0.632 | 5 | | | 0.642 | 6 | | |
| prm4 | Useful life at the end of concession period. | 0.661 | 5 | | | 0.608 | 6 | | | 0.717 | 5 | | |
| prm5 | Bankability of project | 0.890 | 1 | | | 0.904 | 1 | | | 0.875 | 1 | | |
| prm6 | Monopolistic advantage | 0.539 | 8 | | | 0.584 | 8 | | | 0.492 | 8 | | |
| prm7 | Ability of project to generate third party revenue | 0.453 | 10 | | | 0.464 | 10 | | | 0.442 | 10 | | |
| prm8 | Opportunities for future refinancing | 0.584 | 7 | | | 0.592 | 7 | | | 0.575 | 7 | | |
| prm9 | Potential for property development rights | 0.494 | 9 | | | 0.536 | 9 | | | 0.450 | 9 | | |
| prm10 | Level of tariffs and tolls. | 0.722 | 4 | | | 0.688 | 3 | | | 0.758 | 4 | | |

| | *rho* |
|---|---|
| $rho_{privatepublic}$ for nature of project | *-0.888* |
| $rho_{privatepublic}$ for marketability | *-0.861* |
| $rhoav_{privatepublic\text{-}gtattr}$ | *-0.875* |

*Notes:*
- $I_{sub}$ - relative significance index for the sub-attributes
- $r_{sub}$ - ranking of the sub-attributs
- $I_{mean}$ - relative significance index of the main attributes
- $r_{mean}$ - ranking of the main attributes
- rho - spearmam's rank correlation coefficient

At 0.005 level of significance with N=21,
*rho critical* from statistical tables is 0.556

Since -0.875 is lesser than -0.556 *Ho* is rejected

For N = 21, *rhoav* = 0.875 from the statistical tables shows that a value as large as this is significant at $p < 0.001$ level (one-tail test). Thus we could reject *Ho* at $\alpha = 0.001$ level.

**Further check using Kendall's Coefficient of Concordance**

From the relationship $\boxed{rhoav =} \quad \boxed{\frac{kW-1}{k-1}}$

where
*W* = Kendall's Coefficient of Concordance (level of agreement)
*k* = is the sets of ranking (= 2)

*Hence* $\boxed{W =} \quad \boxed{\frac{rhoav(k-1)+1}{k}}$

W = *0.938*

again $\boxed{\chi 2 =} \quad \boxed{k(N-1)W}$

with N = 21

$\boxed{\chi 2 =}$ 37.500

From statistical tables we find that $\boxed{\chi 2} \boxed{\geq}$ 37.500 with a *df* = N - 1 = 20 has a probability of occurrence under *Ho* of $0.001 < p < 0.01$. Hence it can be concluded with considerable assurance that the agreement between the public and private is higher than it will be by chance.

The very low probability under the Ho associated with the observed value of W enables us to reject the null hypothesis that the ratings for the sets are unrelated. Hence we accept the alternative hypothesis that the ratings are related.

## General Rating of External Environment Attributes

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| project ID | 50 | 49 | 40 | 38 | 33 | 31 | 29 | 19 | 15 | 13 | 12 | 3 | 2 | 1 | 48 | 47 | 46 | 45 | 42 | 41 | 39 | 35 | 34 | 32 | 28 | 27 | 23 | 14 | 9 | 8 | 6 | 5 | 21 | 17 | 11 | 7 | 44 | 37 | 30 | 22 | 20 | 18 | 43 | 36 | 26 | 24 | 16 | 10 | 4 | isub | imain |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| respondent | pr | pr | pu | pu | pr | pu | pr | pr | pr | pr | pu | pu | pr | pr | pr | pr | pr | pr | pu | pu | pu | pr | pu | pu | pr | pu | pr | pr | pu | pu | pr | pu | pr | pu | pu | pu | pr | pu | pr | pr | pu | pu | pu | pr | pr | pu | pu | pr | pu | | |
| project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | off | off | rdt | stl | rdt | rdt | rdt/b | rdt | rlt | fld | fld | w/s | rlt | w/s | rlt | | |
| ***Attributes*** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Socio-Economic** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.673** |
| es1 Availability of traditional projects. | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 5 | 3 | 3 | 4 | 3 | 5 | 3 | 1 | 1 | 5 | 3 | 2 | 2 | 4 | 2 | 4 | 3 | 1 | 1 | 2 | 3 | 3 | 3 | 2 | 4 | 4 | 5 | 5 | 4 | 2 | 2 | 3 | 1 | 3 | 3 | 4 | **0.606** | |
| es2 Maturity of the financial markets. | 4 | 3 | 4 | 4 | 3 | 4 | 5 | 4 | 5 | 4 | 3 | 5 | 4 | 4 | 3 | 5 | 5 | 4 | 4 | 3 | 2 | 4 | 5 | 4 | 4 | 2 | 5 | 3 | 4 | 3 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 4 | 5 | 3 | 3 | 2 | 1 | 3 | 3 | 4 | **0.735** | |
| es3 Perceived future economic uncertainties | 4 | 3 | 4 | 4 | 3 | 4 | 3 | 3 | 3 | 5 | 2 | 4 | 4 | 3 | 2 | 4 | 4 | 4 | 3 | 4 | 3 | 3 | 5 | 5 | 4 | 3 | 4 | 2 | 3 | 3 | 3 | 2 | 2 | 4 | 3 | 5 | 3 | 4 | 5 | 5 | 3 | 4 | 3 | 4 | 2 | 1 | 3 | 3 | 3 | **0.682** | |
| es4 Potential for future equity purchase in PPP projects | 3 | 3 | 4 | 3 | 4 | 1 | 3 | 3 | 5 | 4 | 2 | 3 | 4 | 3 | 2 | 3 | 5 | 3 | 1 | 3 | 2 | 3 | 4 | 2 | 3 | 2 | 4 | 3 | 3 | 2 | 3 | 4 | 2 | 4 | 4 | 4 | 4 | 3 | 5 | 5 | 2 | 5 | 2 | 2 | 3 | 1 | 3 | 3 | 5 | **0.629** | |
| es5 Strong public/private sector relationships. | 5 | 4 | 4 | 5 | 4 | 3 | 5 | 3 | 5 | 3 | 4 | 5 | 4 | 4 | 3 | 4 | 4 | 4 | 5 | 3 | 4 | 3 | 1 | 3 | 4 | 4 | 4 | 2 | 3 | 2 | 3 | 4 | 3 | 5 | 2 | 3 | 4 | 1 | 5 | 5 | 3 | 4 | 5 | 3 | 4 | 2 | 3 | 3 | 4 | **0.722** | |
| | 20 | 16 | 19 | 19 | 17 | 15 | 19 | 16 | 21 | 19 | 13 | 20 | 19 | 19 | 13 | 19 | 22 | 18 | 18 | 16 | 12 | 14 | 20 | 17 | 17 | 13 | 21 | 12 | 17 | 13 | 12 | 13 | 11 | 20 | 16 | 19 | 17 | 16 | 24 | 25 | 17 | 22 | 15 | 14 | 14 | 6 | 15 | 15 | 20 | | |
| **Political/Legal/Regulatory regime** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.623** |
| ep1 Public acceptability of the PPP/Private Finance philosophy. | 5 | 2 | 5 | 4 | 5 | 3 | 4 | 4 | 4 | 4 | 2 | 3 | 4 | 4 | 4 | 4 | 5 | 3 | 4 | 2 | 3 | 3 | 1 | 4 | 4 | 4 | 5 | 3 | 4 | 3 | 3 | 3 | 4 | 5 | 4 | 5 | 5 | 3 | 5 | 5 | 4 | 5 | 4 | 4 | 3 | 1 | 4 | 1 | 4 | **0.739** | |
| ep2 Stability of the political system. | 4 | 3 | 5 | 3 | 5 | 4 | 5 | 3 | 3 | 4 | 2 | 5 | 4 | 5 | 2 | 4 | 5 | 3 | 4 | 3 | 3 | 3 | 1 | 4 | 4 | 4 | 4 | 3 | 4 | 5 | 1 | 3 | 4 | 5 | 2 | 5 | 5 | 5 | 5 | 5 | 2 | 4 | 3 | 4 | 3 | 3 | 4 | 1 | 3 | **0.727** | |
| ep3 Level of all-party political support for the philosophy | 5 | 3 | 5 | 4 | 4 | 2 | 4 | 3 | 3 | 4 | 3 | 5 | 4 | 4 | 2 | 4 | 5 | 3 | 3 | 3 | 2 | 5 | 2 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 2 | 4 | 5 | 2 | 5 | 5 | 5 | 5 | 5 | 2 | 4 | 4 | 3 | 3 | 1 | 5 | 1 | 3 | **0.718** | |
| el1 Clearly defined planning and regulatory frameworks. | 4 | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 5 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 5 | 2 | 5 | 3 | 4 | 5 | 5 | 4 | 5 | 4 | 5 | 2 | 4 | 5 | 4 | 2 | 3 | 5 | 2 | 5 | 4 | 4 | 2 | 5 | 4 | 4 | 3 | 5 | 3 | 3 | 4 | 3 | 3 | **0.751** | |
| el2 Ability of foreign investors to repatriate earnings | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 3 | 1 | 4 | 2 | 3 | 1 | 2 | 2 | 2 | 3 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 3 | 1 | 3 | 4 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 1 | 2 | 5 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 4 | **0.396** | |
| el3 Clearly defined legislation on foreign ownership of property | 4 | 3 | 3 | 2 | 2 | 1 | 1 | 4 | 1 | 3 | 1 | 2 | 2 | 2 | 1 | 2 | 3 | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 3 | 1 | 3 | 3 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 2 | 2 | 2 | 5 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | **0.400** | |
| el4 Clearly defined legislation on intellectual property rights. | 3 | 4 | 3 | 2 | 4 | 1 | 2 | 3 | 5 | 3 | 2 | 2 | 3 | 3 | 1 | 3 | 4 | 2 | 2 | 3 | 2 | 1 | 1 | 2 | 4 | 1 | 3 | 2 | 2 | 4 | 1 | 1 | 1 | 4 | 3 | 4 | 2 | 3 | 4 | 5 | 3 | 3 | 2 | 1 | 1 | 1 | 3 | 2 | 3 | **0.506** | |
| el5 Clearly established institutional and policy frameworks on PPP/PFI | 5 | 3 | 3 | 4 | 4 | 4 | 5 | 4 | 5 | 3 | 2 | 2 | 4 | 3 | 2 | 3 | 3 | 2 | 5 | 5 | 3 | 4 | 4 | 3 | 4 | 1 | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 5 | 3 | 3 | 4 | 5 | 2 | 3 | 5 | 2 | 4 | **0.747** | |
| | 33 | 24 | 30 | 24 | 31 | 19 | 25 | 27 | 27 | 29 | 17 | 25 | 26 | 27 | 18 | 26 | 33 | 19 | 25 | 23 | 21 | 23 | 16 | 25 | 31 | 20 | 31 | 25 | 24 | 29 | 19 | 17 | 22 | 31 | 22 | 35 | 30 | 27 | 29 | 40 | 21 | 27 | 24 | 24 | 17 | 14 | 27 | 14 | 28 | | |

***Notes***

$$(isub) = \sum_{i=1}^{n} r/(r^* x n x N)$$

$$(imain) = \sum_{i=1}^{n} r/(r^* x n x N)$$

where $(isub)$ = the relative significance index for the sub-attributes;
$(imain)$ = the relative significance index for the main attributes;
r = the degree of significance assigned by each respondent to the *i* th attribute;
$r^*$ = the ideal or anchor score i.e. highest score (5 in this case);
n = the number of responses;
N = the total number of sub-attributes under each main attribute.

pr = private
pu = public
hlth = health
sch = school
off = offices
rdt = road transport
fld = flood defence
w/s = water and sewerage
rlt = rail transport

# Private Sector rating of Extl Environment Attributes

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | project ID | 50 | 49 | 33 | 29 | 19 | 15 | 13 | 12 | 3 | 2 | 1 | 48 | 47 | 41 | 34 | 28 | 27 | 9 | 6 | 11 | 44 | 37 | 18 | 43 | 24 | | |
| | respondents | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | rdt | rdt | rdt | fld | fld | w/s | | |
| | ***Attributes*** | | | | | | | | | | | | | | | | | | | | | | | | | | **isub** | **imain** |
| | **Socio-Economic** | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.694** |
| es1 | Availability of traditional projects. | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 5 | 3 | 3 | 4 | 3 | 1 | 2 | 4 | 2 | 1 | 2 | 2 | 4 | 5 | 2 | 3 | 3 | **0.592** | |
| es2 | Maturity of the financial markets. | 4 | 3 | 3 | 5 | 4 | 5 | 4 | 4 | 4 | 3 | 5 | 5 | 4 | 4 | 4 | 5 | 3 | 2 | 2 | 4 | 5 | 5 | 3 | 2 | 3 | **0.760** | |
| es3 | Perceived future economic uncertainties | 4 | 3 | 3 | 3 | 3 | 3 | 5 | 4 | 3 | 2 | 4 | 4 | 4 | 3 | 4 | 4 | 2 | 3 | 2 | 3 | 5 | 5 | 4 | 2 | 3 | **0.680** | |
| es4 | Potential for future equity purchase in PPP pjts | 3 | 3 | 4 | 3 | 3 | 5 | 4 | 4 | 3 | 2 | 3 | 5 | 3 | 3 | 3 | 4 | 3 | 3 | 2 | 4 | 5 | 5 | 2 | 3 | 3 | **0.680** | |
| es5 | Strong public/private sector relationships. | 5 | 4 | 4 | 5 | 3 | 5 | 3 | 4 | 4 | 3 | 4 | 4 | 4 | 3 | 4 | 4 | 2 | 3 | 3 | 4 | 5 | 5 | 3 | 4 | 3 | **0.760** | |
| | | 20 | 16 | 17 | 19 | 16 | 21 | 19 | 19 | 19 | 13 | 19 | 22 | 18 | 14 | 17 | 21 | 12 | 12 | 11 | 17 | 24 | 25 | 14 | 14 | 15 | | |
| | **Political/Legal/Regulatory regime** | | | | | | | | | | | | | | | | | | | | | | | | | | | **0.646** |
| ep1 | Public acceptability of the PPP/Private Finance philosophy. | 5 | 2 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | | 5 | 3 | 3 | 4 | 5 | 3 | 3 | 4 | 5 | 5 | 5 | 4 | 3 | 1 | **0.744** | |
| ep2 | Stability of the political system. | 4 | 3 | 5 | 5 | 3 | 3 | 4 | 4 | 5 | 2 | 4 | 5 | 3 | 3 | 4 | 4 | 3 | 1 | 4 | 5 | 5 | 5 | 4 | 3 | 1 | **0.736** | |
| ep3 | Level of all-party political support for the philosophy. | 5 | 3 | 4 | 4 | 3 | 3 | 4 | 4 | 4 | 2 | 4 | 5 | 3 | 5 | 4 | 4 | 3 | 4 | 4 | 5 | 5 | 5 | 3 | 3 | 1 | **0.752** | |
| el1 | Clearly defined planning and regulatory frameworks. | 4 | 3 | 5 | 3 | 3 | 5 | 4 | 4 | 4 | 4 | 4 | 5 | 2 | 5 | 5 | 5 | 2 | 4 | 3 | 4 | 2 | 5 | 5 | 3 | 3 | **0.768** | |
| el2 | Ability of foreign investors to repatriate earnings. | 3 | 3 | 2 | 1 | 3 | 1 | 4 | 1 | 2 | 2 | 2 | 3 | 2 | 1 | 3 | 3 | 4 | 1 | 1 | 2 | 2 | 5 | 1 | 1 | 2 | **0.440** | |
| el3 | Clearly defined legislation on foreign ownership of property | 4 | 3 | 2 | 1 | 4 | 1 | 3 | 2 | 2 | 1 | 2 | 3 | 2 | 1 | 3 | 3 | 3 | 1 | 1 | 2 | 2 | 5 | 1 | 1 | 2 | **0.440** | |
| el4 | Clearly defined legislation on intellectual property rights. | 3 | 4 | 4 | 2 | 3 | 5 | 3 | 3 | 3 | 1 | 3 | 4 | 2 | 1 | 4 | 3 | 2 | 1 | 1 | 2 | 4 | 5 | 1 | 1 | 2 | **0.536** | |
| el5 | Clearly established institutional and policy frameworks on PPP/PFI | 5 | 3 | 4 | 5 | 4 | 5 | 3 | 4 | 3 | 2 | 3 | 3 | 2 | 4 | 4 | 4 | 5 | 4 | 4 | 5 | 4 | 5 | 5 | 2 | 2 | **0.752** | |
| | | 33 | 24 | 31 | 25 | 27 | 27 | 29 | 26 | 27 | 18 | 22 | 33 | 19 | 23 | 31 | 31 | 25 | 19 | 22 | 30 | 29 | 40 | 24 | 17 | 14 | | |

***Notes***

$$(isub) = \sum_{i=1}^{n} r/(r^* xn)$$

$$(imain) = \sum_{i=1}^{n} r/(r^* xnxN)$$

where $(isub)$ = the relative significance index for the sub-attributes;
$(imain)$ = the relative significance index for the main attributes;
r = the degree of significance assigned by each respondent to the *i* th attribute;
r* = the ideal or anchor score i.e. highest score (5 in this case)
n = the number of responses;
N = the total number of sub-attributes under each main attribute.

## Public Sector rating of Extl Environment Attributes

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| project ID | 40 | 38 | 31 | 12 | 3 | 42 | 41 | 39 | 34 | 32 | 27 | 9 | 8 | 5 | 17 | 11 | 7 | 37 | 20 | 18 | 43 | 24 | 16 | 4 | | |
| respondents | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | | |
| project type | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | off | stl | rdt/b | rdt | rlt | w/s | rlt | rlt | | |
| ***Attributes*** | | | | | | | | | | | | | | | | | | | | | | | | | **isub** | **imain** |
| **Socio-Economic** | | | | | | | | | | | | | | | | | | | | | | | | | | **0.652** |
| es1 Availability of traditional projects. | 3 | 3 | 3 | 2 | 3 | 5 | 3 | 1 | 5 | 3 | 2 | 4 | 3 | 1 | 3 | 3 | 3 | 4 | 5 | 4 | 2 | 1 | 3 | 4 | **0.608** | |
| es2 Maturity of the financial markets. | 4 | 4 | 4 | 3 | 5 | 4 | 3 | 2 | 5 | 4 | 2 | 4 | 3 | 2 | 4 | 4 | 4 | 4 | 4 | 5 | 3 | 1 | 3 | 4 | **0.708** | |
| es3 Perceived future economic uncertainties | 4 | 4 | 4 | 2 | 4 | 3 | 4 | 3 | 5 | 5 | 3 | 3 | 3 | 2 | 4 | 3 | 5 | 4 | 3 | 4 | 3 | 1 | 3 | 3 | **0.683** | |
| es4 Potential for future equity purchase in PPP pjts | 4 | 3 | 1 | 2 | 3 | 1 | 3 | 2 | 4 | 2 | 2 | 3 | 2 | 4 | 4 | 4 | 4 | 3 | 2 | 5 | 2 | 1 | 3 | 5 | **0.575** | |
| es5 Strong public/private sector relationships. | 4 | 5 | 3 | 4 | 5 | 5 | 3 | 4 | 1 | 3 | 4 | 3 | 2 | 4 | 5 | 2 | 3 | 1 | 3 | 4 | 5 | 2 | 3 | 4 | **0.683** | |
| | 19 | 19 | 15 | 13 | 20 | 18 | 16 | 12 | 20 | 17 | 13 | 17 | 13 | 13 | 20 | 16 | 19 | 16 | 17 | 22 | 15 | 6 | 15 | 20 | | |
| **Political/Legal/Regulatory regime** | | | | | | | | | | | | | | | | | | | | | | | | | | **0.595** |
| ep1 Public acceptability of the PPP/Private Finance philosophy. | 5 | 4 | 3 | 2 | 3 | 4 | 2 | 3 | 1 | 4 | 4 | 4 | 3 | 3 | 5 | 4 | 5 | 3 | 4 | 5 | 4 | 1 | 4 | 4 | **0.700** | |
| ep2 Stability of the political system. | 5 | 3 | 4 | 2 | 5 | 4 | 3 | 3 | 1 | 4 | 4 | 4 | 5 | 3 | 5 | 2 | 5 | 5 | 2 | 4 | 3 | 3 | 4 | 3 | **0.717** | |
| ep3 Level of all-party political support for the philosophy. | 5 | 4 | 2 | 3 | 5 | 3 | 3 | 2 | 2 | 4 | 4 | 4 | 3 | 2 | 5 | 2 | 5 | 5 | 2 | 4 | 4 | 1 | 5 | 3 | **0.683** | |
| el1 Clearly defined planning and regulatory frameworks. | 3 | 3 | 3 | 3 | 3 | 5 | 3 | 4 | 5 | 4 | 4 | 4 | 5 | 2 | 5 | 2 | 5 | 4 | 4 | 4 | 3 | 3 | 4 | 3 | **0.733** | |
| el2 Ability of foreign investors to repatriate earnings. | 3 | 2 | 1 | 2 | 3 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 3 | 1 | 1 | 2 | 2 | 1 | 1 | 4 | **0.350** | |
| el3 Clearly defined legislation on foreign ownership of property | 3 | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 4 | **0.358** | |
| el4 Clearly defined legislation on intellectual property rights. | 3 | 2 | 1 | 2 | 2 | 2 | 3 | 2 | 1 | 2 | 1 | 2 | 4 | 1 | 4 | 3 | 4 | 3 | 3 | 3 | 2 | 1 | 3 | 3 | **0.475** | |
| el5 Clearly established institutional and policy frameworks on PPP/PFI | 3 | 4 | 4 | 2 | 2 | 5 | 5 | 3 | 4 | 3 | 1 | 4 | 5 | 4 | 5 | 4 | 5 | 4 | 3 | 3 | 4 | 3 | 5 | 4 | **0.742** | |
| | 30 | 24 | 19 | 17 | 25 | 25 | 23 | 21 | 16 | 25 | 20 | 24 | 29 | 17 | 31 | 22 | 35 | 27 | 21 | 27 | 24 | 14 | 27 | 28 | | |

***Note***

$$(isub) = \sum_{i=1}^{n} r/(r^* xn)$$

$$(imain) = \sum_{i=1}^{n} r/(r^* xnxN)$$

whe ($isub$) = the relative significance index for the sub-attributes;
($imain$) = the relative significance index for the main attributes;
r = the degree of significance assigned by each respondent to the $i$ th attribute;
r* = the ideal or anchor score i.e. highest score (5 in this case)
n = the number of responses;
N = the total number of sub-attributes under each main attribute.

Appendix D

## Testing of hypothesis 3: agreement between the private and public sectors - *External Environment Attributes*

| | Attributes | overall rating *n* = 49 | | | | private sector rating *n* = 25 | | | | public sector rating *n* = 24 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *i sub* | *r sub* | *i main* | *r main* | *i sub* | *r sub* | *i main* | *r main* | *i sub* | *r sub* | *i main* | *r main* |
| | **Socio-Economic** | | | 0.673 | 1 | | | 0.694 | 1 | | | 0.652 | 1 |
| se1 | Availability of traditional projects | 0.600 | 5 | | | 0.592 | 5 | | | 0.608 | 4 | | |
| se2 | Maturity of the financial markets. | 0.735 | 1 | | | 0.760 | 1.5 | | | 0.708 | 1 | | |
| se3 | Perceived future economic uncertainties | 0.682 | 3 | | | 0.680 | 3.5 | | | 0.683 | 2.5 | | |
| se4 | Potential for future equity purchase in PPP p/s | 0.629 | 4 | | | 0.680 | 3.5 | | | 0.575 | 5 | | |
| se5 | Strong public/private sector relationships. | 0.722 | 2 | | | 0.760 | 1.5 | | | 0.683 | 2.5 | | |
| | **Political/Legal/Regulatory regime** | | | 0.623 | 2 | | | 0.650 | 2 | | | 0.595 | 2 |
| ep1 | Public acceptability of the PPP/Private Finance philosophy | 0.739 | 3 | | | 0.776 | 1 | | | 0.700 | 4 | | |
| ep2 | Stability of the political system. | 0.727 | 4 | | | 0.736 | 5 | | | 0.717 | 3 | | |
| ep3 | Level of all-party political support for the philosophy | 0.718 | 5 | | | 0.752 | 3.5 | | | 0.683 | 5 | | |
| el1 | Clearly defined planning and regulatory frameworks. | 0.751 | 1 | | | 0.768 | 2 | | | 0.733 | 2 | | |
| el2 | Ability of foreign investors to repatriate earnings | 0.396 | 8 | | | 0.440 | 7.5 | | | 0.350 | 8 | | |
| el3 | Clearly defined legislation on foreign ownership of property | 0.400 | 7 | | | 0.440 | 7.5 | | | 0.358 | 7 | | |
| el4 | Clearly defined legislation on intellectual property rights. | 0.506 | 6 | | | 0.536 | 6 | | | 0.475 | 6 | | |
| el5 | Clearly established institutional and policy frameworks on PPP/PFI | 0.747 | 2 | | | 0.752 | 3.5 | | | 0.742 | 1 | | |

| | *rho* |
|---|---|
| *rho privatepublic* for socio-economic | *0.703* |
| *rho privatepublic* for political/legal/regulatory regime | *0.938* |
| *rhoav* privatepublic-extlattr. | 0.820 |

*Notes.*
- *i sub.* - relative significance index for the sub-attributes
- *r sub.* - ranking of the sub-attributs
- *i main.* - relative significance index of the main attributes
- *r main.* - ranking of the main attributes
- rho - spearmam's rank correlation coefficient

For N = 13, *rhoav* = 0.820 from the statistical tables shows that a value as large as this is significant at $p < 0.001$ level (one-tail test). Thus we could reject *Ho* at $\alpha = 0.001$ level.

### Further check using Kendall's Coefficient of Concordance

From the relationship $\boxed{rhoav =} \quad \boxed{\frac{kW-1}{k-1}}$

where
*W* = Kendall Coefficient of Concordance (level of agreement)
*k* = is the sets of ranking (= 2)

*Hence* $\boxed{W =} \quad \boxed{\frac{rhoav(k-1)+1}{k}}$

W = *0.910*

again $\boxed{\chi 2 =} \quad \boxed{k(N-1)W}$

with N = 13

$\boxed{\chi 2 =}$ 21.845

From statistical tables we find that $\boxed{\chi^2}$ $\boxed{\geq}$ 21.845 with a *df* = *N* - 1 = 12 has a probability of occurrence under *Ho* of $p < 0.05$ Hence it can be concluded with considerable assurance that the agreement between the public and private is higher than it will be by chance.

The very low probability under the Ho associated with the observed value of W enables us to reject the null hypothesis that the ratings for the sets are unrelated. Hence we accept the alternative hypothesis that the ratings are related.

## General Rating of main components - all projects

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | project ID | 50 | 49 | 40 | 38 | 33 | 31 | 29 | 19 | 15 | 13 | 12 | 3 | 2 | 1 | 48 | 47 | 46 | 45 | 42 | 41 | 39 | 35 | 34 | 32 | 28 | 27 | 23 | 14 | 9 | 8 | 6 | 5 | 21 | 17 | 11 | 7 | 44 | 37 | 30 | 22 | 20 | 18 | 43 | 36 | 26 | 24 | 16 | 10 | 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | respondents | pr | pr | pu | pu | pr | pu | pr | pr | pr | pr | pu | pu | pr | pr | pr | pr | pr | pr | pu | pu | pu | pr | pu | pu | pr | pu | pr | pr | pu | pu | pr | pu | pr | pu | pu | pu | pr | pu | pr | pr | pu | pu | pr | pr | pu | pu | pr | pu | | | |
| | project type | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | off | off | rdt | stl | rdt | rdt | rdt/b | rdt | rlt | fld | fld | w/s | rlt | w/s | rlt | | | |
| | ***Attributes*** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ***index*** | ***ranking*** |
| ca | **Consortium Attributes** | 3 | 4 | 3 | 3 | 2 | 4 | 4 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 1 | 3 | 4 | 3 | 3 | 4 | 4 | 4 | 2 | 4 | 3 | 4 | 4 | 4 | 3 | 3 | 2 | 4 | 3 | 3 | 4 | 3 | 3 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | **0.653** | **2** |
| psa | **Public Sector Client Attributes** | 4 | 3 | 2 | 4 | 2 | 2 | 4 | 4 | 1 | 4 | 3 | 3 | 4 | 4 | 3 | 4 | 3 | 2 | 4 | 3 | 4 | 3 | 4 | 4 | 3 | 3 | 4 | 3 | 3 | 2 | 3 | 4 | 2 | 4 | 4 | 2 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 2 | 2 | 3 | 4 | 4 | 4 | **0.657** | **1** |
| pa | **Project Attributes** | 3 | 2 | 4 | 2 | 4 | 3 | 3 | 2 | 3 | 4 | 3 | 4 | 2 | 1 | 4 | 2 | 2 | 3 | 3 | 2 | 3 | 2 | 3 | 4 | 3 | 2 | 3 | 3 | 3 | 4 | 1 | 3 | 4 | 1 | 3 | 4 | 4 | 3 | 4 | 4 | 3 | 4 | 2 | 3 | 3 | 2 | 3 | 4 | 3 | **0.588** | **3** |
| eea | **External Environment Attributes** | 4 | 3 | 1 | 1 | 1 | 1 | 2 | 4 | 4 | 3 | 1 | 1 | 2 | 3 | 2 | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 3 | 4 | 1 | 2 | 2 | 2 | 1 | 4 | 2 | 1 | 2 | 2 | 1 | 3 | 3 | 4 | 4 | 3 | 3 | 1 | 1 | 2 | 1 | 3 | 1 | 2 | **0.416** | **4** |

***Note***

$$(isub) = \sum_{i=1}^{n} r/(r^* xn)$$

$$(imain) = \sum_{i=1}^{n} r/(r^* xnxN)$$

where $(isub)$ = the relative significance index for the sub-attributes;
$(imain)$ = the relative significance index for the main attributes;
r = the degree of significance assigned by each respondent to the *i* th attribute;
$r^*$ = the ideal or anchor score i.e. highest score (5 in this case);
n = the number of responses;
N = the total number of sub-attributes under each main attribute.

# Private Sector rating of Main Components - all projects

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| project ID | | 50 | 49 | 33 | 29 | 19 | 15 | 13 | 2 | 1 | 48 | 47 | 46 | 45 | 35 | 28 | 23 | 14 | 6 | 21 | 44 | 30 | 22 | 36 | 26 | 10 | | |
| respondents | | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | pr | | |
| project type | | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | rdt | rdt | rdt | fld | fld | w/s | | |
| | ***Attributes*** | | | | | | | | | | | | | | | | | | | | | | | | | | | *index* | *ranking* |
| ca | **Consortium Attributes** | 3 | 4 | 2 | 4 | 3 | 2 | 3 | 3 | 2 | 1 | 3 | 4 | 3 | 4 | 3 | 4 | 4 | 2 | 3 | 3 | 4 | 4 | 4 | 3 | 4 | | **0.632** | 1.5 |
| psa | **Public Sector Client Attributes** | 4 | 3 | 2 | 4 | 4 | 1 | 4 | 4 | 4 | 3 | 4 | 3 | 2 | 3 | 3 | 4 | 3 | 3 | 2 | 4 | 3 | 4 | 2 | 2 | 4 | | **0.632** | 1.5 |
| pa | **Project Attributes** | 3 | 2 | 4 | 3 | 2 | 3 | 4 | 2 | 1 | 4 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 1 | 4 | 4 | 4 | 4 | 3 | 3 | 4 | | **0.584** | 3 |
| eea | **External Environment Attributes** | 4 | 3 | 1 | 2 | 4 | 4 | 3 | 2 | 3 | 2 | 1 | 1 | 2 | 1 | 4 | 2 | 2 | 4 | 1 | 3 | 4 | 4 | 1 | 2 | 1 | | **0.488** | 4 |

***Note***

$$(\mathbf{i}sub) = \sum_{i=1}^{n} r/(r * xn)$$

$$(\mathbf{i}main) = \sum_{i=1}^{n} r/(r * xnxN)$$

where $(\mathbf{i}sub)$ = the relative significance index for the sub-attributes;
$(\mathbf{i}main)$ = the relative significance index for the main attributes;
r = the degree of significance assigned by each respondent to the *i* th attribute;
r* = the ideal or anchor score i.e. highest score (5 in this case);
n = the number of responses;
N = the total number of sub-attributes under each main attribute.

## Public Sector rating of Main Components - all projects

**Project Type: Hospitals, Schools, Office Buildings road transport, w & s, flood defence, rail transport (all projects)**

| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| project ID | | 40 | 38 | 31 | 12 | 3 | 42 | 41 | 39 | 34 | 32 | 27 | 9 | 8 | 5 | 17 | 11 | 7 | 37 | 20 | 18 | 43 | 24 | 16 | 4 | | |
| respondents | | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | pu | | |
| project type | | hlth | hlth | hlth | hlth | hlth | sch | sch | sch | sch | sch | sch | sch | sch | sch | off | off | off | stl | rdt/b | rdt | rlt | w/s | rlt | rlt | | |
| | ***Attributes*** | | | | | | | | | | | | | | | | | | | | | | | | | *index* | *ranking* |
| ca | **Consortium Attributes** | 3 | 3 | 4 | 2 | 2 | 3 | 4 | 4 | 2 | 4 | 4 | 3 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 4 | 4 | **0.675** | 1 |
| psa | **Public Sector Client Attributes** | 2 | 4 | 2 | 3 | 3 | 4 | 3 | 4 | 4 | 4 | 3 | 3 | 2 | 4 | 4 | 4 | 2 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | **0.683** | 2 |
| pa | **Project Attributes** | 4 | 2 | 3 | 3 | 4 | 3 | 2 | 3 | 3 | 4 | 2 | 3 | 4 | 3 | 1 | 3 | 4 | 3 | 3 | 4 | 2 | 2 | 3 | 3 | **0.592** | 3 |
| eea | **External Environment Attributes** | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 3 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | 3 | 3 | 3 | 1 | 1 | 3 | 2 | **0.342** | 4 |

***Note***

$$(\mathbf{i}sub) = \sum_{i=1}^{n} r/(r^{*}xn)$$

$$(\mathbf{i}main) = \sum_{i=1}^{n} r/(r^{*}xnxN)$$

where $(isub)$ = the relative significance index for the sub-attributes;
$(imain)$ = the relative significance index for the main attributes;
r = the degree of significance assigned by each respondent to the *i* th attribute;
r* = the ideal or anchor score i.e. highest score (5 in this case);
n = the number of responses;
N = the total number of sub-attributes under each main attribute.

Appendix D

## Testing of hypothesis 3: agreement between the private and public sectors - *Main Components*

| | | overall rating (A) *n = 49* | | private sector rating (B) *n = 24* | | public sector rating )C ) *n = 25* | |
|---|---|---|---|---|---|---|---|
| | *Components* | $I_{comp}$ | $r_{comp}$ | $I_{comp}$ | $r_{comp}$ | $I_{comp}$ | $r_{comp}$ |
| ca | Consortium Attributes | 0.653 | 2 | 0.632 | 1.5 | 0.675 | 2 |
| psa | Public Sector Client Attributes | 0.657 | 1 | 0.632 | 1.5 | 0.683 | 1 |
| pa | Project Attributes | 0.588 | 3 | 0.584 | 3 | 0.592 | 3 |
| eea | External Environment Attributes | 0.416 | 4 | 0.488 | 4 | 0.342 | 4 |

*Notes.*

*Icomp:-* relative significance index for the main component

*rcomp:-* ranking of the main components

*rho:-* spearmam's rank correlation coefficient

| | *rho* |
|---|---|
| $rho_{(privatepublic)}$ | *0.949* |

For N = 4, $rho_{privatepublic}$ = 0.946 from the statistical tables shows that a value as large as this is significant at $0.25 > p > 0.10$ level (one-tail test). Thus we could reject *Ho* at $\alpha = 0.25$ level.

### Further check using Kendall's Coefficient of Concordance

From the relationship $rhoav = \frac{kW-1}{k-1}$

where

$W$ = Kendall Coefficient of Concordance (level of agreement)

$k$ = is the sets of ranking (= 2)

*Hence* $W = \frac{rhoav(k-1)+1}{k}$

W = *0.974*

again $\chi 2 = k(N-1)W$

with N = 4

$\chi 2 =$ 5.846

From statistical tables we find that $\chi^2 \geq$ 5.846 with a $df = N - 1 = 3$ has a probability of occurrence under *Ho* of $0.20 > p > 0.10$. Hence it can be concluded with considerable assurance that there is fair amount of agreement between the public and private is higher than it will be by chance.

The very low probability under the Ho associated with the observed value of W enables us to reject the null hypothesis that the ratings for the sets are unrelated. Hence we accept the alternative hypothesis that the ratings are related.